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I.

ACUTE THYROIDITIS AS A COMPLICATION OF ACUTE TONSILLITIS.*

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During the past ten years a number of cases of acute thyroiditis, seven in all, have come under the writer's observation. This may not appear to be a large number, but acute thyroiditis is a fairly uncommon and interesting condition, and for that reason a paper on the subject may be timely.

The writer's cases are of particular interest from an etiologic standpoint, as in all except one case the inflammation of the thyroid gland occurred with or directly after attacks of tonsillitis.

Four of the patients have been seen from time to time during a number of years, and the writer's observations are particularly based on these cases. Two of these patients have each had two distinct attacks of acute thyroiditis, each time

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with an acute tonsillitis, and both have since developed well-marked diffuse goiters.

In both of these cases, as well as in all of the cases reported in this paper, the inflammation of the thyroid occurred in a previously healthy gland of normal size. For this reason, and because in no case did suppuration occur, the cases belong in the class described by Mygind and other authors under the name "thyroiditis acuta simplex," particularly to distinguish them from cases of acute strumitis in which the disease involves the already hypertrophied thyroid gland.

Suppuration occurs much more frequently in this class of cases, and they are not so uncommon, occurring sometimes with pneumonia, measles, typhoid fever, influenza, diphtheria, etc.

The writer's patients were all girls and young women, and a search of the literature shows that this is true in the majority of the cases. The only case that did not occur with tonsillitis was one that developed during the course of a pneumonia.

A point of particular interest is the fact that two of the patients have since their attacks of acute thyroiditis developed well-marked goiters.

Two others had attacks of hyperthyroidism with all the typical symptoms developing soon after the attacks of acute tonsillitis and thyroiditis.

I do not wish to be understood as emphasizing the above facts as being important etiologic factors in the development of goiter, but it is by no means impossible that the repeated inflammatory attacks the gland was subjected to in the two cases before referred to may have partly at least been responsible for the subsequent chronic hypertrophy of the gland.

S. P. Beebe,[1] in an interesting paper in the *New York State Journal of Medicine*, states that "a considerable number of these patients have tonsils and adenoids, and an acute attack of hyperthyroidism may follow promptly an acute attack of tonsillitis."

He also says that "these patients often give a history of repeated attacks of acute tonsillitis preceding the development of a goiter, and that any acute throat condition should be avoided."

Lücke[24] has given perhaps the best description of acute

inflammations of the healthy thyroid gland. He divides them, according to their etiology, into three forms: the idiopathic, traumatic, and metastatic.

A classification of acute suppurative thyroiditis and acute simple thyroiditis is more practical, however, and has been adopted in the writer's paper.

Acute simple thyroiditis which runs its course without suppuration is a rare disease, and a primary acute inflammation of the thyroid gland is declared by Ochsner and Thompson in their classical work, "The Surgery and Pathology of the Thyroid and Parathyroid Glands," to be so rare that it is almost never seen. I have been able, however, to find a few cases in the literature which will be referred to.

I would again emphasize the necessity of distinguishing between the cases of inflammation of a previously hypertrophied gland, strumitis acuta, which is not so uncommon, particularly where goiter is endemic, and the cases of acute inflammation of a previously healthy gland. There is some confusion in the literature in this respect, as several authors have used the terms incorrectly.

Simple acute thyroiditis must also not be confused with acute hyperemia of the thyroid gland, such as is seen in anomalies of menstruation and acute infectious diseases. It is not uncommon in measles epidemics, particularly in Switzerland, where goiter is endemic.

Symptoms.—The symptoms in cases of acute thyroiditis are quite characteristic. A symptom, and one causing the patient perhaps the most discomfort, is the dysphagia which is practically always present. This difficulty in swallowing, which is largely mechanical, due to the compression of the esophagus, is most marked when the swelling of the left lobe of the thyroid is very decided, because the esophagus is closer to the left lobe than to other parts of the thyroid. The dysphagia, as in cases three and four (writer's), is sometimes so great that for several days it is difficult for the patient to swallow even liquids. The writer is, however, of the impression that if some of the cases of acute thyroiditis are carefully studied, it will be found that the dysphagia is partly at least caused by the intense acute angina which often precedes the attack, and will be found more frequently than the reported cases indicate.

Acute thyroiditis is accompanied by a more or less acute congestion and swelling of the mucosa of the upper air passages, and the dyspnea, which is also a frequent symptom, is caused by both the compression of the trachea by the greatly swollen thyroid and the congestion of the tracheal mucous membrane.

A good many of the cases start with a chill, headache, prostration and other symptoms of an acute infectious process. There is always an elevation of temperature, but this is rarely either very high or prolonged, except in the cases that go on to suppuration. The swelling of the thyroid varies, but is usually considerable, and there is sometimes considerable congestion of the surrounding parts.

WRITER'S CASES.

Case 1.—Miss L. B., aged twenty years, came into the Nose and Throat Clinic at St. Peter's Hospital in 1906, with history of sore throat for several days. On examination a typical acute follicular tonsillitis was found. The thyroid gland was greatly and uniformly swollen, with some redness of the skin, and very tender to the touch. This developed during the third day of tonsillitis, and the patient stated that the gland was not enlarged before her attack of tonsillitis. The swelling of the thyroid increased during the next two days, and there was some dyspnea, undoubtedly caused by tracheal compression. Deglutition was very painful, but there was not as much dysphagia as in some of the other cases, perhaps because the left lobe of the gland was not more involved than the other parts.

Temperature was 103° F. for several days. The usual treatment for tonsillitis was given, and an ice coil was kept around the neck constantly until the swelling of the thyroid gland subsided, which was in about a week. The temperature gradually dropped, being normal within a week and remaining so.

Patient would not consent to a tonsillectomy, and the following winter came to the clinic with a similar attack, running the same course and again developing with an acute tonsillitis.

This patient came to the clinic at regular intervals during the next two years, and while there were no further attacks of acute thyroiditis, she developed a gradually increasing diffuse goiter. It is at least possible that etiologically there is

a connection between her attacks of thyroiditis and the subsequent hypertrophy of the gland. There is no doubt that the infection of the gland was each time caused by the acute tonsillitis.

The only internal medication that this patient—and in fact all the writer's patients—received was calomel in the beginning of the attack and urotropin in large doses, freely diluted.

Just how much good urotropin did these cases I am not prepared to say. Many good results are reported from its use in acute processes of the upper air passages.

As before stated, none of the writer's cases went on to abscess formation in the gland. The constant use of the ice coil was of the greatest service and reduced the acute congestion of the gland very promptly in all cases.

Case 2.—Young woman, married, age twenty-two years. Same history as in preceding case. Acute thyroiditis developed during an attack of acute tonsillitis, and the development of the attack could again be observed from the beginning. The thyroid was greatly congested and extremely sensitive to pressure. Dysphagia and dyspnea, as in the last case.

Cold applications to neck again reduced the swelling of the thyroid quickly, and this subsided with the improvement of the acute angina, showing an undoubted connection between the two conditions. She was practically well in ten days, and I did not see her again for about two months, when she came to the clinic with typical symptoms of hyperthyroidism.

Cases 3 and 4.—Both young women, ages twenty-one and twenty-four years, respectively, unmarried. Both stated that before the present attack they had had no enlargement of the thyroid.

One patient was just getting over a severe attack of acute tonsillitis, and the other was still having an acute attack. In both patients the thyroid gland was greatly swollen and extremely sensitive to the touch.

The dysphagia in both cases was extreme, so that for several days liquids could be swallowed with great difficulty. There was also great dyspnea for two or three days. The ice bag with the treatment used in the other cases, reduced the inflamed thyroids quickly.

Temperature for four or five days was 103° F., and they were very ill with chills and great prostration.

Case 5.—Mrs. J., aged twenty-five years. I was called to see this patient by her attending physician for a swelling of the thyroid which developed after the crisis of pneumonia. The swelling increased rapidly for several days, and there was the usual great tenderness. The throat was reddened, but there was no history of an acute angina. Her physician stated that her thyroid had been entirely normal before the pneumonia. The attack ran the usual course of about ten days, and yielded to the same treatment.

Case 6.—Miss A. S., aged nineteen years. First seen in January, 1908. Had had a very severe acute tonsillitis a week before I saw her, and developed the acute thyroiditis immediately after the attack.

The attack ran the usual course, and a year later another acute thyroiditis came on with an acute follicular tonsillitis. This patient has been under observation continuously, and had developed a well-marked diffuse goiter, which started about six months after her last attack of thyroiditis.

Case 7.—In the seventh case, that of a woman, aged thirty years, a very severe acute thyroiditis came on directly after an acute tonsillitis. There was a good deal of dyspnea and dysphagia in this case, and within a few months after the attack she developed a typical condition of hyperthyroidism.

Of the cases found in the literature on the subject, I could find only the following references to acute angina, as a cause for acute thyroiditis:

Lewis and O'Neil,[2] who reported severe pharyngitis and great pain in swallowing for two weeks with the attack.

v. Handing's case[12] and Ewald's contribution.[14] Ewald calls attention to the fact that the inflammation of the thyroid may follow inflammatory processes of neighboring parts, and particularly acute sore throat.

Denger[8] and Pieri[5] have described the relation of acute thyroiditis and Graves' disease. Pieri has collected six cases, and Denger has reported seven cases.

PRIMARY CASES.

The primary cases are the rarest of all, and there are only a few in the literature.

The youngest case on record (primary) is that reported by Carpenter,[11] in a boy fourteen months old.

Goldberger,[4] Weber[9] and Burk[7] have also reported primary cases.

The above cases, so far as I could determine, were nonsuppurating cases, and the following are the only other authentic cases belonging in this classification that I could find. In all of them the thyroid had been previously healthy. They have been reported by Cruvelhier,[25] Bauchet,[26] Brieger,[28] Koppe,[27] Barlow,[29] Given,[30] Charrot,[31] Koranyi,[32] and Zesas.[33]

In these cases the ages of the patients, mostly women, were between twenty and thirty years, with the exception of Barlow's case, which occurred in a child three years old.

Mygind's case[23] followed a nasal infection terminating in erysipelas.

Diphtheria was responsible for the inflammation of the thyroid in Brieger's case, typhoid in Koranyi's and malaria in Zesas'.

Of the other cases in the literature, Schwerin[6] has reported two cases of the nonsuppurative type of thyroiditis, and Collet[5] has reported a case with whooping cough in a child eighteen months old. An abscess formed in this case, and it is one of the youngest cases on record.

Sabitt[10] has reported thirteen cases from the Geneva clinic, including one of his own. He states that cases occurring with pneumonia are usually mild. When bacteriologic findings were positive, pneumococci were found in 44.82 per cent of the cases.

Kyle[13] has reported two cases of the thyroiditis simplex type, both in young men aged twenty-four years. He found in both cases changes in the blood, increase in fibrin, and diminished function of the red blood corpuscles.

The following were also found: One reported by Bruney,[16] following pneumonia; one after influenza, reported by Browne,[17] and one by Smeeton[18]; two after influenza by Kiffen[19] and Ismet[22]; and one by Robertson,[20] following diphtheria in which an abscess formed.

Bauer[21] has reported three cases during the course of scarlet fever.

A study of the reported cases shows that in a fairly large percentage the inflammatory attack involved a gland that had been chronically enlarged, also that the majority of the cases occurred with or followed acute diseases such as diphtheria,

scarlet fever, influenza, pneumonia, etc. Exclusive of the writer's cases, there were only a few cases reported as a result of tonsillitis.

BIBLIOGRAPHY.

1. Beebe, S. P.: Medical Treatment of Graves' Disease. New York State Journal of Medicine, September, 1912.
2. Lewis and O'Neil: Journal American Medical Association, November 12, 1910.
3. Collet: Lyon Medicale, No. 41, October, 1910.
4. Goldberger: Wiener medicinische Wochenschrift, No. 32, 1910.
5. Pieri: Ref. in Centralbl. f. Laryngol., February, 1910.
6. Schwerin: Zwei Fälle nicht eitriger Thyreoditis. Münch. med. Wochenschrift, No. 4, 1908.
7. Burk: Münch. med. Wochenschrift, No. 41, 1908.
8. Denger, R.: Ueber acute nicht eitrige Thyreoditis. Münch. med. Wochenschrift, No. 36, 1908.
9. Weber: La thyreoidite aigue simple. Revue Med. de la Suisse romande, No. 3, 1909.
10. Sabitt: Contribution a l'etude des thyroidites. Genf, 1909.
11. Carpenter: A Case of Acute Primary Thyroiditis in an Infant. Reports of the Study of Diseases in Children. Vol. 3, p. 157, 1903.
12. Handing, v.: Thyroiditis Acuta. Ref. in Centralbl. für Laryngol., p. 399, 1902.
13. Kyle, D. B.: Annals of Otol., Rhin. and Laryngol., May, 1900.
14. Ewald: Zur Aetiologie der Strumitis. Münch. medicinische Wochenschrift, No. 29, 1896.
15. Ochsner and Thompson: The Surgery and Pathology of the Thyroid and Parathyroid Glands, p. 20, 1910.
16. Bruney, Chas.: A Case of Acute Inflammation of the Thyroid Gland. Lancet, June 15, 1911.
17. Browne, P.: British Med. Journal, June 8, 1895.
18. Smeeton, C.: British Med. Journal, May 18, 1895.
19. Kiffen, J.: British Med. Journal, January 22, 1895.
20. Robertson, W. S.: Lancet, April 8, 1911.
21. Bauer: Die Scharlachthyroiditis. Monatschrift für Kinderheilkunde, 1911.
22. Ismet: Revue hebdom. de laryngologie, No. 5, 1911.
23. Mygind, Holger: Thyroiditis Acuta Simplex. Journal of Laryngol., Rhinol. and Otol., March, 1895.
24. Lücke: Handbuch der allgemeinen und speciellen Chirurgie, Band 3, 1875.
25. Cruvelhier: Gazette des Hopitaux, Vol. 1.
26. Bauchet: De la thyroidite et du goitre enflamme.
27. Koppe: Thyroiditis Idiopathica. St. Petersburg Med. Zeitschrift, Band xv, 1868.
28. Brieger, L.: Charite Annalen, Band 8, p. 124, 1881.
29. Barlow: A Case of Acute Enlargement of the Thyroid Gland in a Child. Trans. Clin. Soc. London, Vol. xxi, p. 17, 1888.
30. Given, T. C.: Acute Thyroiditis. Lancet, Vol. 2, p. 935, 1892.
31. Charrot: Revue de Chirurgie, pp. 701-730, 1890.
32. Koranyi: Ueber die acute Entzündung der Schilddrüse, 1892.
33. Zesas, S. G.: Ueber Thyroiditis und Strumitis bei Malarie. Centralbl. für Chir., p. 532, 1885.

II.

THE DIAGNOSIS OF ENDOCRANIAL COMPLICATIONS OF SUPPURATIVE LABYRINTHITIS.

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As a result of the greater attention which otologists in recent years have paid the labyrinth, there has developed an increasing appreciation of labyrinthine infection as a cause of intracranial complications. Unquestionably, suppurative disease in the labyrinth is one of the most prolific sources of otitic intracranial infections, particularly those that affect the structures in the posterior fossa of the skull.

That the labyrinth should so frequently act as the conveyor of a middle ear infection to the cranial contents is not astonishing when we consider the intimate relationship between the labyrinthine capsule and the middle ear spaces on the one hand, and the avenues of communication between endolabyrinthine and endocranial spaces on the other.

The promontory, the oval and round windows, and the cupola of the external semicircular canal lie exposed in the middle ear and aditus. The superior semicircular canal is almost in direct contact with the dura of the middle fossa, while the posterior semicircular canal is often very close to the cerebellar dura.

The endolymph spaces in the labyrinth are in direct communication with the subarachnoid space through the lymph channels in the sheath of the eighth nerve as the latter passes through the internal auditory canal to the cerebellopontine angle. The perilymph spaces of the labyrinth communicate directly with the subarachnoid space through the aqueductus cochleæ. From the saccule and utricle a fine tube (the ductus endolymphaticus) leads to the posterior surface of the petrosa,

where it emerges midway between the internal auditory meatus and the lateral sinus. Here is broadens into the saccus endolymphaticus, a bag-like structure which lies between the layers of the cerebellar dura, often extending out as far as the wall of the lateral sinus.

Intracranial complications occur with both acute and chronic labyrinthine suppuration. They are, however, relatively more common with acute labyrinthitis because there is no time for the inflammatory process in the labyrinth to be walled off. On account of the overwhelming predominance of chronic over acute suppurative labyrinthitis, intracranial complications are really more frequently observed associated with the chronic form.

Endocranial infections that originate in the labyrinth may extend from the latter through various paths. They may travel through preformed avenues of communication, such as the aqueductus cochleæ or the lymph spaces surrounding the nerve. Such an extension results usually in rapidly spreading meningitic processes. Meningitis is the most common form of endocranial infection complicating suppurative labyrinthitis. Not infrequently, however, even when the infection progresses through the lymph channels along the eighth nerve, there occurs a collection of pus localized in the internal auditory canal. This condition occurs particularly with chronic suppurative labyrinthitis. The abscess owes its limitation to the arrangement of the sheaths of eighth nerve in the canal. The arachnoid sheath leaves the nerve some distance from the fundus of the canal and applies itself to the dural lining of the bony walls at the area cribrosa, thus closing off a funnel-shaped space at the fundus, separate from the inner portion of the canal. In this space an abscess may remain localized until the arachnoid barrier is broken down. Then the infection spreads to the intracranial cavity.

Labyrinthine infection may spread to the endocranium through the ductus and saccus endolymphaticus, or by necrosis of the posterior or superior semicircular canal. The infective process which reaches the endocranium by one of these routes is usually localized, as the spread of the infection to the cranial cavity is necessarily very slow. Necrosis of the posterior semicircular canal results in disease of the posterior fossa and necrosis of the superior canal in disease of the middle fossa.

The saccus endolymphaticus lies between two layers of the dura, just anterior to the lateral sinus. An abscess in the saccus may extend backward until it comes to lie in the inner wall of the lateral sinus, and may thus give rise to an infective process within the sinus.

The labyrinthine veins empty into the inferior petrosal sinus. Through these veins a labyrinthine infection may extend into the inferior petrosal sinus, and may spread backward to the bulb and lateral sinus, or forward into the cavernous sinus.

Endocranial complications of suppurative labyrinthitis usually occur in the posterior fossa, rarely in the middle fossa. They are:

1. Extradural abscess.
2. Interdural abscess (saccus empyema).
3. Subdural abscess.
4. Cerebellar abscess (rarely temporosphenoidal abscess).
5. Meningitis: 1, circumscribed; 2, diffuse; (a) serous; (b) purulent.
6. Thrombosis of dural sinuses (most commonly lateral sinus; occasionally extension through petrosal to cavernous sinus).

Some symptoms are common to all forms of infective processes in the posterior cranial fossa. Oftentimes these forms cannot be differentiated one from the other, and we must content ourselves with the tentative diagnosis of an infective process in the posterior cranial fossa, until operation or autopsy shows the particular form of involvement.

Intracranial extension of a labyrinthitis occurs only, as a rule, after the endolabyrinthine spaces have been involved in a diffuse suppurative process. It is almost unknown with serous or circumscribed labyrinthitis. Consequently we find upon examination, in most of the cases of intracranial complication of labyrinthine disease, complete loss of labyrinthine function, that is, total deafness, negative caloric and fistula tests, and on rotation, signs of destruction of one labyrinth, either recent or of long standing.

Rarely, in the cases which complicate acute labyrinthitis, the labyrinthine functions may not yet have been entirely destroyed when the endocranial complication has begun. In these cases it will still be possible to arouse the labyrinth by some form of stimulation.

Signs of manifest labyrinthitis are not often seen with intracranial complications, with the exception of meningitis complicating an acute suppurative labyrinthitis. Without doubt there have been many instances in which the labyrinthine symptoms were confused with the early meningitic symptoms. Indeed, these symptoms are often so intermingled that there is considerable difficulty in differentiating between them. The symptoms of labyrinthitis occur only at the beginning of the acute cases and day by day become less severe. Several weeks after the onset of an acute labyrinthitis there are no longer any manifest symptoms present, nor are they to be found in those cases where the endocranial condition complicates a chronic labyrinthitis. In many of the cases, however, if the previous history is gone into carefully, one or more attacks of dizziness, with or without vomiting, will be recalled. In some cases a typical history of an attack of labyrinthitis, lasting one or two weeks, will be brought out. Occasionally, too, inquiry with regard to hearing will elicit the fact that hearing was suddenly lost; or, on the other hand, the patient may state that he does not recall when he had hearing in the affected ear.

Symptoms of disease in the posterior cranial fossa closely resemble those of disease of the labyrinth itself, because the former are due to irritation of the labyrinthine centers. Cases of meningitis and cerebellar disease have often been mistaken for labyrinthitis.

Where the labyrinthine functions have been impaired but not entirely destroyed, it is very difficult to differentiate between labyrinthine disease alone and labyrinthine disease complicated by disease in the posterior fossa. Where the labyrinthine functions have been totally destroyed, as occurs in the majority of cases, the existing symptoms can, of course, be easily ascribed to the complicating intracranial lesion. In the former cases we must call other symptoms to our assistance.

Among these are temperature and headache, which practically never occur with an uncomplicated labyrinthitis. The symptom of enduring caloric nystagmus, as described by Neumann, is of value here, especially with cerebellar abscess, but it may also be elicited when there is pressure on the cerebellum from extra- or subdural collections of pus. If in cere-

bellar disease cold water be allowed to flow into the sound ear, it will cause a nystagmus to the opposite side, lasting five or ten minutes. The cerebellar cortex exercises an inhibitory influence over the vestibular centers, just as the cerebral cortex exercises an inhibitory control over the spinal motor centers. Disease in the cerebellar cortex results in loss of this inhibition of the vestibular centers, with the result that when the latter are aroused by the stimulus produced by cold water in the ear, the resulting response, namely the nystagmus, is very violent and lasts a long time.

The nystagmus which accompanies disease in the posterior fossa differs in nowise from that due to labyrinthine disease. It is of the same type as nystagmus of labyrinthine origin and occurs in the same planes. In the advanced stages there are disturbances of consciousness, and signs indicative of meningitis.

Let us, for the sake of clearness, assume some concrete cases. We have a patient who complains of vertigo and deafness. On examination we find that he has a spontaneous nystagmus to the right. His right ear is in a condition of chronic suppuration. His left ear is normal. He is completely deaf in the right ear, and his static labyrinth on that side is unirritable. Without any further examination we can make a diagnosis of disease in the posterior cranial fossa, for a dead labyrinth cannot cause a nystagmus toward its own side.

If, however, we find some hearing in the right ear and a positive caloric reaction, we must look for further data to help us in our diagnosis. The duration of the symptoms is of assistance to us. If the symptoms have been continuous and have lasted more than two or three weeks, we are probably dealing with endocranial disease, for the symptoms of a circumscribed labyrinthitis are intermittent, and those of a diffuse labyrinthitis improve after the first few days and, excepting the nystagmus, have usually completely disappeared after ten days or two weeks. Symptoms of endocranial disease, on the other hand, either remain constant or become progressively worse. In cases where we are in doubt, Neumann advises doing a labyrinth operation. If the nystagmus toward the affected ear persists after the extirpation of the labyrinth, we are unquestionably dealing with endocranial disease.

During the radical mastoid or labyrinth operation we may

find a condition which will lead us to explore the posterior fossa, such as a fistula in the dura or a very much discolored dura. But we can very well have an intracranial suppuration with a macroscopically normal inner table and dura. The condition of the labyrinth itself as disclosed intraoperatively may sometimes help us in determining to explore the posterior fossa. If, in the presence of symptoms suggesting endocranial complications, we find at operation an eroded labyrinthine capsule and the endolabyrinthine spaces filled with granulations, our suspicion of disease in the posterior fossa would be very much strengthened.

The presence of headache, especially if it be persistent and localized, is suggestive of endocranial involvement, for labyrinthine suppuration, in itself, does not cause pain. We must, of course, exclude pain due to disease of the mastoid. The location of the pain is no guide as to the location of the intracranial disease. We may have frontal pain with disease in the cerebellum. The pain varies from an occasional slight feeling of discomfort to a constant agonizing pain which even morphin will not relieve, and which causes the patient to toss from side to side and to moan in anguish.

Often it is possible to elicit a point of tenderness to percussion on the skull. In some cases the pain is referred to a localized area, irrespective of what portion of the skull is percussed. We have never, however, been able to assure ourselves of the change in the percussion note over a brain abscess as described by Macewen.

The presence of temperature for which no other cause can be determined also points to intracranial disease. The same may be said of a high leucocyte count. A peculiar beating tinnitus in the affected ear is often complained of in disease of the posterior fossa. This is all the more striking when the functional tests disclose the fact that hearing has been totally destroyed.

In every suspicious case lumbar puncture should be done. A turbid cerebrospinal fluid will, of course, give us positive information, but a negative fluid does not exclude endocranial disease. A sterile turbid fluid seems to be characteristic of brain abscess. This condition was found in two cases observed by the writers, and in many cases reported in the literature. Turbidity does not necessarily mean a diffuse meningitis.

Optic neuritis does not occur in uncomplicated labyrinthitis, but it is absent in many cases of brain abscess and meningitis. Stupor, delirium, rigidity of the neck, Kernig's sign, etc., leave us in no doubt as to the diagnosis.

The direction of the falling, or the tendency to fall, helps us sometimes. With uncomplicated labyrinthitis the falling is always in the direction of the slow component of the nystagmus, and is definitely influenced by changes in the position of the head. In endocranial disease the direction of the falling follows no rigid rules; although in cerebellar abscess there is usually a tendency to fall toward the diseased side, irrespective of the direction of the nystagmus, if this be present.

Bárány's pointing tests are often of considerable assistance in making a diagnosis. With disease in the right cerebellar hemisphere there is a spontaneous pointing-by to the right of the right arm, forearm or hand, irrespective of the direction of the spontaneous nysgtamus. If an artificial horizontal nystagmus to the right is produced by rotation or cold water, the right arm, forearm or hand will not point-by to the left, as would be the case if the cerebellum were normal.

Sometimes the patient is unconscious when first seen. In this condition a nystagmus is represented by a conjugate deviation of the eyes in the direction of the slow component of the nystagmus. If an unconscious patient has a deviation of the eyes to the right, and a chronic suppurating ear on the left side, and cold water allowed to flow into this ear does not change the position of the eyes, he probably has a cerebellar abscess of labyrinthine origin. If cold water brings the eyes over to the left, the endocranial condition is not labyrinthogenic.

The symptoms which are common to all forms of inflammatory processes in the posterior fossa are headache, vomiting, and vertigo. Temperature elevation is also common to all except cerebellar abscess.

Extradural abscess may occur without any symptoms outside of those of the labyrinthitis. It is often found accidentally in the course of a labyrinth operation. This is one of the arguments in favor of the Neumann operation, as here, since the cerebellar dura is exposed, we may find an epidural abscess which would otherwise remain undiscovered.

Interdural abscess is usually due to saccus empyema, and

can be positively diagnosticated, according to Kramm, only when the pus works its way backward between the two layers of the dura until it lies between the lateral sinus and cerebellum, and then infects both of these structures. A combination of the symptoms of suppurative labyrinthitis, sinus thrombosis and cerebellar abscess usually means a saccus empyema.

Subdural abscess gives symptoms similar to those of cerebellar abscess.

In cerebellar abscess there is usually little or no temperature. It may even be subnormal. The pulse is apt to be slow —fifty to sixty. Rapid and extreme emaciation is very common, and the vomiting is usually more persistent than in abscesses affecting the cerebrum. There may be optic neuritis. There is apt to be a sterile turbid cerebrospinal fluid under pressure. There may be a spontaneous pointing-by in an outward direction of the arm, forearm or hand on the affected side, and on arousing a nystagmus toward this side there will be no pointing-by inward—i. e., toward the other side. There may be a hemiparesis of the affected side or a disturbance of joint and posture sense. There may be adiadokokinesis—i. e., an inability to execute rapidly successive volitional movements.

The symptoms of meningitis are too familiar to all to require enumeration here.

The symptoms of sinus thrombosis are irregular fever with marked remissions, chills and sweats, bacteremia, and perhaps evidences of metastatic abscesses. With involvement of the cavernous sinus there are, in addition to these symptoms, edema of the lids and conjunctiva, proptosis of the eyeball, strabismus, and dilatation of the pupil. With cavernous sinus thrombosis the blood culture is usually negative.

Occasionally, labyrinthine suppuration gives rise to endocranial disease as a result of perforation through the superior semicircular canal. When this occurs the symptoms will, of course, be those of disease in the middle fossa.

III.

A REPORT OF THE RESULTS OF SEVEN CASES OPERATED UPON BY MR. HEATH.*

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BOSTON.

INTRODUCTION.

A week before the Ninth International Otological Congress held in Boston in August, 1912, Mr. Charles Heath of London was given the freedom of the Aural Department of the Massachusetts Charitable Eye and Ear Infirmary. This was done through the courtesy of the board of trustees and of the surgeons then on duty. Mr. Heath was given his choice of cases, and selected seven upon which he operated with his own instruments and with the help of his own assistant. He did the dressings and directed all the treatments during his stay, that is, for about two weeks. During this time he was most gracious and painstaking in instructing the surgeons on duty and the house staff in his method of operating and in his mode of after-treatment. At his departure, he left at the hospital a set of instruments for carrying out the after-treatment and the formulæ of the solutions used for this purpose. During the remainder of August, and for the whole of September and October, in other words, for the rest of the service, Mr. Heath's cases were supervised and dressed by Dr. Plummer and Dr. Mosher, occasionally by the senior house officer, Dr. MacMillan, who was second assistant at the operations and had followed the cases from the start. When the cases were discharged from the house, and they were not discharged until the end of the service, they came under the care of the assistant surgeon in the Out-Patient Department. At first, Mr. Heath's method of after-treatment was followed

*Read before the American Otological Society, Washington, 1913.

rigidly. When certain cases failed to respond to this, the usual after-treatment of the hospital was substituted. What this was can be found in the detailed history of the cases. On April 26, of this year, roughly seven months after the operations, a letter was sent to all of the patients, asking them to report for a final examination. Four of the cases reported, one was out of town and will report later; two cases could not be located.

The subject of this paper is the results obtained by Mr. Heath in the seven cases which he operated. The steps of his operation and his method of performing them are in print and will not be discussed. Further the paper does not deal with his reasons for considering the cases operable. A little is added, however, on the progress of the cases during healing. The writers of this report are in a position of considerable delicacy. They are reporting the results of the work of a guest; a guest who did not have the opportunity of following his cases and who cannot be present at the discussion of them. He was untiring in demonstrating and explaining the cases to us, and then left them manfully and unreservedly in our hands. They are reported without obtaining his formal consent. The report, of course, will be sent to him. Any man can see that a spirit of fairness is necessary on both sides. There was a tacit understanding, that Mr. Heath wished a fresh and a candid and impartial consideration of his work. He paid us the compliment to come to this country for it. We have tried to give it. The writers hope that the bitter personalities which characterized the debate on Mr. Heath's work last August will not be repeated.

The report is made up as follows: The detailed histories of the cases just as they stand in the hospital records are first given, abbreviations and all, without change. This part will be skipped in the spoken paper. The reader will do well to take this part of the paper last. After the detailed histories a short summary of each case is presented. The writers comment on each case, and then summarize the abstracts. The last few paragraphs give some of the impressions which the writers of the report gained from watching Mr. Heath operate and from following the cases afterwards. The detailed histories of the cases follow:

PART I.

Vol. 34, page 301. Margaret Donovan. Age 6. Residence, 21 Carson street, Dorchester, Mass. Birthplace, Massachusetts. August 12, 1912. Reentry Jan. 19, 1912. Vol. 33.

Diagnosis: A. S. o. m. s. a. A. D. o. m. s. a. Recurrent mastoiditis—postaural abscess.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. D. patient was admitted to this hospital Jan. 19, 1912, suffering from A. S. o. m. s. a. A. D. mastoiditis with postaural abscess. A mastoid operation was done by Dr. Lothrop, in which the abscess was incised and the cortex found perforated near canal. Cortex removed and all softened cells curetted out. Antrum found and curetted. Sinus exposed but not opened. Discharged on Feb. 1, 1912. A. D. well until last Monday (one week ago), when pain commenced and has lasted to date. There has been discharge for the past three days. Mastoid tenderness has existed for four days, and swelling for three days. P. E. negative.

Examination: A. D. mastoid scar of previous operation. Marked postaural redness, bulging and fluctuation. Small round perforation in lower part of M. T. Very profuse purulent discharge. A. S. M. T. red and bulging. No landmarks seen. Under primary ether M. T. incised.

Aug. 13. Operation. Ether. Mr. Heath. Usual Heath incision. Pericranial flap cut. About one-half ounce of pus escaped from under periosteum. Small pinhead perforation found in reformed lateral wall of mastoid. Antrum exposed from front and posterior canal wall removed. Antrum burred out and meatal flap cut and M. T. exposed. Perforation in posterior half of drum. Two flaps sutured together. Dressing to antrum and meatus. Usual cut made through helix and tube inserted. Wound closed with seven s. w. g. sutures. Moist dressing. Bandage.

Aug. 14. Sutures removed. Moist dressing reapplied.

Aug. 19. Wound dressed daily by Mr. Heath, who has changed the tympanic and antral dressing daily.

Aug. 25. Incision firmly healed behind. Incision through crus of helix gaping and granulating. Considerable mucus about tube still. Antrum granulated and full. Exuberant

granulations on bridge and on post. sup. segment of M. T. Single gauze wick to M. T. Superior wall of meatus projecting. Tube left out and gauze plug inserted instead.

Aug. 29. Skin incision firmly healed. Scar of first operation slightly elevated. Incision of present operation scarcely visible. Incision through helix healed without deformity. Wick well saturated with pus. Antrum granulated full. Flap in place. Pus in M. E. Large granulations over upper anterior border of bridge, hiding most of M. T.

Sept. 6. Moderate amount of secretion on wick. Antrum closed. M. T. ⅔ seen. Moderate mucopurulent secretion coming from M. E.

Sept. 18. Small area of granulation on bridge removed. Discharge continues.

Sept. 28. Discharge from M. E. has stopped.

Oct. 3. After remaining dry for two days discharge noticed again, but only slight amount.

Oct. 7. No discharge from M. E. since last note.

Oct. 10. Discharged relieved to O. P. D.

Vol. 34, page 258. Name, Joseph Weinstein. Age, 21. Occupation, factory operator. Birthplace, Russia. Residence, Eastman House, Revere, Mass. July 29, 1912.

Diagnosis: A. D. o. m. s. a. Mastoiditis.

Operation: Heath mastoid operation. Mr. Heath.

History: A. D. patient had a "head cold" three weeks ago, following which A. D. pained for one day and was lanced by Dr. Myers of Chambers street. A. D. has discharged since and patient has syringed it. Pain stopped until two days ago, when it became very severe at intervals. He has had occasional headaches. Mastoid tenderness two days. P. E. negative. Urine negative.

Examination: Considerable tenderness over tip and antrum. No postaural redness. Very profuse purulent discharge from M. T. Large irregular perforation in posterior lower quadrant. Considerable edema of superior canal wall.

Aug. 3. Operation. Ether. Mr. Heath. Incision made at junction of attachment of auricle posteriorly. Pericranium exposed and temporal muscle. Pericranial flap cut and held back, cortex exposed. Antrum exposed from the front, cortex being removed along anterior part of bony canal.

Antrum burred out. Meatal flap cut and M. T. exposed. Perforation found at lower posterior quadrant. Posterior canal wall previously having been taken down to within ⅛ inch of M. T. Flaps trimmed and sutured with one C. G. suture. Canal incised through helix. Dressing to antrum and tympanum. Tube fitted and inserted into canal. Wound closed with 7 s. w. g. sutures. Moist dressing. Bandage. Lotion washed out many small white flakes, said to be cholesteatoma. (Mr. Heath.) Air forced from antrum through perforation in M. T.

Aug. 4. Sutures removed. Moist dressing reapplied. No temperature. No headache.

Aug. 5. Tube removed from meatus. Dressing removed from antrum. Dressing very painful. Plug left in meatus. Moist dressing reapplied.

Aug. 6. Under gas plug removed from antrum. Antrum wiped with iodoform emulsion and small dressing reapplied to antrum and tympanum.

Aug. 7. Tube changed. Antrum and tympanum redressed with plugs wet with iodoform emulsion. Air blown through perforation by Valsalva's method.

Aug. 10. Temperature up to 103°. Headache for three days. Mastoid wound well healed.

Aug. 14. Up and about. Dressed and tube changed every day since operation.

Aug. 19. Incision fully healed. No induration of wound. Temperature 99°. Headache during P. M., beginning at 4 P. M. for several days. No pain in ear. Slight discharge. Incision through crus of helix ¾ healed. Slight granulation in lower part. Considerable discharge from meatus. Few granulations on upper meatal wall along edge of flap. Perforation patent by Valsalva. Tag of flap on upper wall.

Aug. 22. Profuse amount of discharge from M. E. Incision through helix healed. Tag of flap on superior wall still. Antrum ½ obliterated. Bridge covered with granulations. Valsalva successful. Pus blown from M. E.

Aug. 26. Considerable amount of granulations from incision through helix, these were trimmed and cauterized with Ag No_3 stick. Antrum well filled in. M. E. still discharges freely. Valsalva shows patent perforation and semi-purulent discharge blown through.

Aug. 30. Incision through crus of helix slightly gaping inferiorly, otherwise healed. Moderate amount of discharge from canal. Valsalva successful, expelling pus from M. E. Antrum granulated full. Grans. on anterior surface of bridge and covering in places the M. T. Slight tag of flap in middle of superior wall. Gauze wick saturated with zinc. sulph. to M. T. Tube reapplied.

Sept. 6. Tube still in. Much foul discharge about tube. Incision through crus of helix healed without deformity. Much pus in canal and about M. T. Slight dimpling at site of antrum. Flap well back and in place. No tags. Thin pus blown from M. E. Posterior half of M. T. seen. Tube out, gauze wick to canal.

Sept. 27. Tag of flap posteriorly superiorly. Canal filled with aristol. Two days ago patient developed cervical adenitis on right side of neck. ℞ Hot sulphonaphthol poultices.

Oct. 4. Neck continues to be painful. Swelling less. Discharge, however, continues from M. E., but now only slight amount.

Oct. 10. Ether. Operation. Dr. MacMillan. Right tonsil removed in usual way. No point of infection found. Left tonsil not touched, as patient did very poorly under ether and tonsil presented no indication for removal.

Oct. 16. Since removal of tonsil adenitis has improved, but ear still discharges a small amount of pus daily.

Oct. 21. Adenitis well. M. E. still slightly moist. Two-thirds of M. T. visible. Antrum well epidermatized. Small round perforation in lower posterior quadrant. Discharged relieved to O. P. D.

Dec. 30, 1912. A. D. M. T. of normal appearance; landmarks seen; antrum well epidermatized over. Ear dry.

August 1, 1912.

R				L
18				18
—		W		—
25				25
—		V		—
8		AC	25″	15
—	F 512 V. S.	—	—	—
10		BC	12″	10
	WEBER < F 256 V. S.			
N		LIMITS GALTON		N
128 V. S.		LOW		V. S. 80

September 21, 1912.

R				L
15				18
—		W		—
25				25
—		V		—
12		AC	25″	21
—	F 512 V. S.	— —	—	—
14		BC	12″	12
	WEBER < F 256 V. S.			
N		LIMITS GALTON		N
128 V. S.		LOW		V. S. 80

October 21, 1912.

R				L
18				18
—		W		—
25				25
—		V		—
25		AC	25″	22
—	F 512 V. S.	— —	—	—
14		BC	12″	18
	WEBER < F 256 V. S.			
N		LIMITS GALTON		N
80 V. S.		LOW		V. S. 80

Vol. 34, page 273. Frank Sapanari. Age, 30. Birthplace, Italy. Residence, Attleboro, Mass. Laborer.

August 31, 1912.

Diagnosis: A. D. o. m. s. a.

Operation: Heath conservative mastoid.

History: A. D. Two months ago the patient had pain below the right auricle. It soon went away and one month ago he felt the ear blocked up. He came to O. P. D. and had cerumen syringed out of both ears. At that time he had otitis externa diffusa in A. D., and on July 2nd, 1912, canal was incised in O. P. D. Ear commenced to discharge 6 days ago, and mastoid became tender 5 days ago and has been so since. P. E. negative.

Examination: A. D. external canal filled with polyp. Purulent discharge from M. E. No part of M. T. can be seen. Marked mastoid tenderness over antrum, tip and emissary.

Aug. 4. Under gas polyp was removed from A. D. to give better drainage.

Aug. 8. Patient examined today by Dr. Emerson with nasopharyngoscope. Sharp spur on right side of septum in contact with turbinates. Large posterior ends. Vault congested especially on right.

Aug. 9. Operation. Ether. Mr. Heath. Usual Heath incision, etc.

Aug. 10. Sutures removed. Dressing reapplied.

Aug. 15. Patient has been dressed daily by Mr. Heath, who has changed tube and antrum and tympanic dressing and applied iodoform emulsion daily.

Aug. 20. Middle ⅓ of incision not quite healed. Granulation trimmed at this point. One c. m. of incision at upper extremity healed.

Sept. 6. Incision through crus of helix completely healed. Slight redundancy of tissue with slight eversion of posterior lip. Flap boggy. Antrum half granulated in. Considerable pus in M. E. Valsalva successful. Pus expelled. Antrum one-half obliterated. One-fourth of lower posterior part of M. T. seen. Zinc sulph. continued.

Sept. 27. Canal narrowed slightly externally. Superior ridge of flap projects. Opening into antrum 2 m. m. in diameter showing pulsating discharge from M. E. M. E. hard to distinguish. Profuse purulent discharge until last three days. ℞ Sol. M. 2 i. d. Ag No_3 bead to granulations.

Oct. 10. For past few days discharge from M. E. has been less than before. Antrum, however, has failed to fill in.

Oct. 18. Only slight discharge from M. T.

Oct. 25. Slight moisture continues from M. E. Antrum not filled in.

Oct. 29. For past few days practically no discharge from M. E.

Nov. 1. Discharged, relieved to O. P. D.

Patient has been seen from time to time in the O. P. D. (by A. L. M.). Last seen on Dec. 20th, when M. E. was dry and considerable part of antrum filled in. M. T. seen but no perforation noted. Landmarks made out. H. T. 18/25; Rinné 14/9; low limit 96.

August 3, 1912.

R				L
1/6				18
—		W		—
25				25
—		V		—
5		AC	25″	10
—	F 512 V. S.	—	—	—
11		BC	12″	15
	WEBER < F 256 V. S.			
N		LIMITS GALTON		N
128 V. S.		LOW		V. S. 80

Vol. 34, page 305. Louis Kaplan. Age 2. Residence, 161 Union street, Rockland. Aug. 14, 1912.

Diagnosis: A. S. o. m. s. a. Mastoiditis. Postaural abscess.

Operation: Heath conservative mastoid.

History: Patient has had discharge from A. S. for past ten days. Swelling developed over mastoid region six days ago. P. E. negative.

Examination: A. S. Postaural redness, edema, and tenderness. Well localized postaural abscess. M. T. red and bulging posteriorly. No perforation seen. Considerable purulent discharge from M. E.

Aug. 15. Operation. Ether. Mr. Heath. Usual Heath incision, etc.

Aug. 19. Up to today, wound has been dressed daily by Mr. Heath. Sutures removed day after operation, since then antrum and tympanic plug changed daily. Moist dressing used.

Aug. 25. Antrum filled with granulations. Gauze wick to M. T. Owing to gaping of canal wound no wick inserted.

Aug. 30. Skin incision healed. Incision through helix gaping. Much discharge. Edge of canal flap projecting. Antrum granulated full. Flap boggy throughout, hiding M. T. Gauze wick to meatus.

Sept. 6. Incision through crus of helix healed with 2 m. m. separation of edges. Much pus from canal. Flap projecting into canal posteriorly readily pushed back, and large granulation seen at tip of flap projecting forward, hiding antrum and M. E. Granulation removed from tip of flap.

Sept. 20. Flap has been touched up daily with Ag No_3 bead and now able to see M. E. Discharge less.

Oct. 1. Canal now free with only slight projection of flap. Very little discharge from M. E.

Oct. 5. Profuse discharge continues from M. E.

Oct. 16. Discharge as at last note. Today at lower half of mastoid incision there is considerable redness with slight purulent discharge.

Oct. 21. Posterior wound has quieted down. Only slight discharge from wound. Discharge continues from M. E.

Oct. 29. Discharge still continues.

Oct. 30. Middle ear discharge continues and condition of mastoid remains the same.

Nov. 5. Reinfection of mastoid wound fails to respond to treatment.

Nov. 9. M. E. still discharging. Bleeds easily. Few granulations seen. Scharlach red to M. E. Mastoid wound unhealed yet.

Nov. 12. Mastoid wound and middle ear still discharging a good deal. ℞ Tinct. iodin to both.

Nov. 14. Amount of Scharlach red reduced. Mastoid wound red and tender. M. E. still discharges.

Nov. 16. Tinct. iodin to mastoid and middle ear. Both discharging a good deal.

Nov. 20. Wound back of ear discharges less, but fails to heal. M. E. discharges a good deal still.

Nov. 24. Wound over mastoid still fails to heal and middle ear discharges yet.

Nov. 27. Condition the same.

Dec. 2 Posterior wound healing a little. M. E. discharging a good deal yet.

Dec. 5. Operation. Ether. Dr. Jack. Incision made close to auricle to include old incision. Periosteum reflected. Small mastoid cavity found below leading to antrum. Cavity enlarged and curetted. Antrum and M. E. cleaned of granulations. Malleus removed. Eustachian tube curetted. Cavity smoothed out, and posterior canal wall removed to facial ridge. Small graft cut from right thigh and placed within cavity, being held in place by mild indoform tape. Wounds closed with 5 s. w. g. sutures. (Flap was cut from posterior canal wall).

Dec. 7. Patient's temperature has been up since operation, but he appears to be bright and does not complain.

Dec. 10. Dressing changed. Considerable discharge from M. E. and mastoid. Stitches removed, as they had sloughed. Temperature still up, somewhat elevated. Leg was dressed yesterday, is doing well.

Dec. 12. Patient's temperature is still up a little. Posterior wound failed to heal over, and packing projects through it. There is considerable discharge, causing some excoriations of the auricle.

Dec. 14. Packing removed from middle ear. Posterior wound open for about 3 c. m. and gaping. Both M. E. and mastoid wound discharge profusely. Cavity filled with granulations. Evidently graft has not taken.

Dec. 20. Radical cavity dressed daily. Evidently more of graft took. Cavity is covered with granulations and considerable discharge persists from cavity and posterior wound, which is gaping for about 3 c. m. Cavity painted daily with scarlet red 4% in oil.

Dec. 26. Cavity cleaner and wound posteriorly is slowly closing in. Cavity is beginning to show considerable area of epidermatization, especially posteriorly.

Dec. 31. Posterior wound slowly closing in. Considerable discharge continues from cavity. Daily dressings continued. Boric powder in large amounts is now being used.

Jan. 4. Wound slowly improving. Daily dressing with boric powder continued. Considerable area of radical cavity has now epidermatized over.

Jan. 10. Mastoid wound still open and discharge quite abundant. Cavity is epidermatizing and there are not any grans. to be seen. ℞ Pulv. boric.

Jan. 16. Less discharge from mastoid wound, which is closing up slowly. M. E. still discharges a good deal.

Jan. 18. Discharged improved to O. P. D.

Vol. 34, page 224. Name, Russell Noyes. Age, 12. Birthplace, New Hampshire. Residence, 35 Fifth street, East Cambridge, Mass. July 19, 1912.

Diagnosis: A. S. o. m. s. ch.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. S. patient has had discharge from A. S., about once a year with pain at times, and deafness for the past six years. P. E. negative. Urine negative.

Examination: A. S. large perforation involving posterior half of M. T. Incostapedial joint exposed and covered with granulation tissue. Considerable purulent discharge. A. D. M. T. atrophic.

July 29. Under local treatment ear has shown no signs of improvement. Seen by Dr. Knowles, who advises patient to wait for Mr. Heath.

Aug. 12. Operation. Ether. Mr. Heath. Usual Heath incision. Pericranium exposed and flap cut. Flap held back with clip and cortex exposed. Cortex removed at junction of mastoid wall and bony canal and antrum exposed from front. Posterior canal removed down to annulus and M. T.

exposed, showing large perforation in posterior half. Antrum well cleaned out with burr. Dressing to antrum and tympanum. Wound closed by 7 s. w. g. sutures. Large tube inserted through incised helix—moist dressing—bandage.

Aug. 13. Sutures removed. Dressing changed.

Aug. 18. Wound has been dressed daily by Mr. Heath, who has changed antral and tympanic dressing daily, and tube.

Aug. 20. Gauze stained moderately with pyocyaneus. Incision firmly healed in upper half, not quite firm in lower half. Small area of granulations in middle. Abundant purulent discharge around tube. Incision through crus of helix slightly gaping and not healed. Some loss of substance about incision in helix. Antrum, bridge and posterior third of M. T. easily seen. Valsalva not successful. Bridge bare of granulations.

Aug. 22. Antrum one-third filled with granulations. Bridge two-thirds covered. Incision not healed. Flap in good position. Cotton plug of iodoform emulsion to antrum. Gauze wick to M. T.

Aug. 28. Upper two-thirds of incision firmly healed. Lower third slightly gaping. Very little discharge about tube. Incision through crus of helix healed. No deformity. Superior border of flap slightly projecting along median line of superior wall. Antrum one-third obliterated. Valsalva negative. M. T. hidden by granulations from bridge. Bridge covered with granulations. Gauze wick with zinc sulph. to M. T. Wick to antrum.

Sept. 6. Incision practically healed. Incision through crus of helix firmly healed with dimple at upper end. No noticeable deformity. Gauze wick moderately stained. Flap firmly united posteriorly and superiorly. Large granulation over bridge hiding antrum. M. T. not seen. Valsalva negative. Granulation removed from bridge. Antrum then found to be filled with soft granulations.

Sept. 27. Antrum granulated in and ready to epidermatize. Seropurulent discharge from M. E. Anterior half of M. T. red and boggy. Scarlet red to cavity and Sol. M. t. i. d.

Oct. 1. Condition of ear about the same as at last note.

Oct. 13. Today only slight moisture from M. E. Granulation over bridge touched with Ag No_3 bead.

Oct. 19. Antrum closed except for small area about 4 mm. in diameter and of same depth. Very slight moisture in M. E. Posterior half of M. T. seen and rest covered with granulation tissue.

Oct. 21. Discharged relieved to O. P. D.

Dec. 28, 1912. Considerable discharge—slight moisture in antrum, but antrum well epidermatized.

December 28, 1912.

R				L
18				15
—		W		—
25				25
—		V		—
36		AC	25″	17
—	F 512 V. S.	—	—	—
21		BC	12″	14

WEBER < F 256 V. S.

N	LIMITS GALTON	N
96 V. S.	LOW	V. S. 96

Vol. 34, page 275. Name, Murphy, Daniel. Age, 13. Birthplace, Cambridge. Residence, 21 Frank street, Cambridge, Mass. Aug. 5, 1913.

Diagnosis: A. S. eff. o. m. s. Acute exacerbation.

Operation: Heath conservative mastoid. Mr. Heath.

History: A. S. patient has had discharge from A. S. at times since infancy. Three weeks ago pain started. Mastoid tenderness developed this A. M., but there is no swelling. History of similar attack one year ago. P. E. negative. Urine negative.

Examination: Profuse purulent discharge from M. E. M. T. red, but not bulging. Small round perforation in posterior lower quadrant. Patient unable to blow air through perforation. Moderate tenderness over antrum, none over tip. No redness or edema.

Aug. 9. Patient has remained about the same since admission. Seen several times by Mr. Heath, who advised operation. Tenderness less. Profuse discharge from M. E. Transillumination by Dr. Mosher shows slightly light antrum and dark tip.

Aug. 10. Operation. Ether. Mr. Heath. Cortex exposed in usual way. Pericranial flap cut. On opening cortex pus continued to discharge for some time. Probe passed ⅔ inch

upward into antrum and for same distance downward to tip. After pus, blood flowed for some time from the vascular mucous membrane of antrum. This hemorrhage caused slight delay. Antrum treated in usual way with burr. Tip exposed and most of outer wall of a large tip cell removed. Granular tissue in cell left. Small wick drain at tip. Wound closed with one s. w. g. suture.

Aug. 12. Sutures removed. Tube changed.

Aug. 14. Patient dressed daily by Mr. Heath. Tube changed and antrum and tympanic dressing changed daily.

Aug. 18. Incision slightly gaping for full extent. Slight amount of secretion expressed from top. Base of flap which bounds meatus posteriorly and just below helix turned outward, leaving small granulating area. Antrum still large. M. T. not seen. Valsalva negative.

Aug. 20. Gauze moderately stained with pyocyaneus. Incision slightly separated in upper one-half and whole of incision uncaught. Much mucopurulent secretion about tube. Abundant granulations on edges of incision through helix, also on posterior half of meatus. Antrum still large. One-half of bridge covered with granulations. Valsalva successful. Moderate amount of watery discharge blown through. Posterior third of M. T. seen.

Aug. 28. Upper third of incision granulating. Lower third of incision granulating. Incision through crus of helix healed. No deformity. Moderate amount of pus about tube. Wick well saturated with pus. End of canal flap slightly projecting. Roof slightly projecting. Antrum only slightly granular about edges. Bridge covered with granulations except superiorly. Small rim of granulations on bridge anteriorly covering one-third M. T. Valsalva successful. Mucopurulent discharge blown from M. E. Rise of temperature which occurred two days ago has subsided. Gauze wick to antrum and tympanum. White blood count 20,000.

Sept. 6. Incision in lower two-thirds healed. Upper one-third gaping. Flap well in position posteriorly. Superiorly the canal wall falls a little. Antrum apparently very little granulated in. Bridge covered with granulations. Valsalva negative. Rim of granulations extends from bridge and obscure upper half of M. T. Granulations removed from posterior part of bridge. Plain gauze to antrum. Zinc sulphate to M. T.

Sept. 27. Since last note patient has been dressed by Dr. Plummer. No tag or flap in region of antrum, hole 4 cm. in diameter into which probe enters 1 cm. Area of granulations on bridge posteriorly, superiorly. Removed and site touched with Ag. No_3 bead.

Oct. 4. M. E. still continues to discharge slightly. Antrum shows no signs of filling in.

Oct. 14. Condition of antrum same as at note of Sept. 27. About one-quarter of posterior half of M. E. seen, red and granular. Bridge granular, and slight discharge from M. E.

Oct. 14. Discharged relieved to O. P. D.

August 5, 1912.

R				L
18				1
—		W		—
25				25
—		V		—
21		AC	25″	0?
—	F 512 V. S.	— —	— —	—
13		BC	12″	13
	WEBER > F 256 V. S.			
N		LIMITS GALTON		N
80 V. S.		LOW		V. S. 128

October 14, 1912.

R				L
18				1
—		W		—
25				25
—		V		—
30		AC	25″	15
—	F 512 V. S.	— —	— —	—
26		BC	12″	25
	WEBER	F 256 V. S.		
N		LIMITS GALTON		N
80 V. S.		LOW		V. S. 256

Vol. 34, page 21. Elizabeth Taylor, age 21. Birthplace, Mass. Residence, 22 Usher Road, West Medford. August 6, 1912.

Diagnosis: A. S. o. m. s. ch. Exostosis of canal.

Operation: Heath radical mastoid.

History: A. S. patient has had pain and discharge from A. S. for past 17 years, following scarlet fever. Has had treatment frequently since, beginning with discharge. Since August 4th she has had occasional pain. P. E. negative. Urine negative.

Examination: A. S. About 1 cm. from beginning of external auditory canal, canal closed entirely by a diaphragm of fibrous tissue at the superior part of which over an area the size of a large pin head there is crusting. Through this area probe can be passed into M. E.

Aug. 7. Operation. Ether. Mr. Heath. Usual Heath incision, etc., but in this case the bony exostosis was removed together with posterior canal wall. No ossicles found in M. E.

Aug. 8. Sutures removed and dressing reapplied.

Aug. 12. Posterior wound healed. Dressed every day and tube changed.

Aug. 16. Up and about. Small area of granulations coming from tympanic cavity.

Aug. 21. Antrum well filled in with granulations. Considerable amount of granulations over bridge and at posterior part of M. T. Incision in helix well healed.

Aug. 26. Tube has been shortened. Discharge less, but still copious. Zinc sulphate, 10% to grans.

Sept. 2. Tube omitted. Dressed daily. Zinc sulph. to M. E. Sharlach red to cavity.

Sept. 6. For past two days patient has complained of pain over original incision, which is tender to pressure. Considerable redness and swelling at lower part. Incision reopened and about one-half dram of pus expressed. Wicked. Hot sulphonaphthol poultices. Cavity doing nicely and considerable part now epidermatized anteriorly.

Sept. 12. Infection mostly quieted down, but still a little discharge of pus from wound.

Sept. 19. Small area in lower part of incision which is not closed. M. E. closed from view by area of granulations. Up to beginning of old hyperostosis cavity is well epidermatized.

Sept. 27. One-half inch from lower end of incision small fistula one-half inch in length. No bone felt and apparently does not connect with canal. Canal narrow in region of old hyperostosis, beyond which a mass of granulations hide M. E. Posteriorly and superiorly probe strikes bare bone. Ag No_3 bead continued to granulations.

Oct. 5. Granulations in region of M. E. which repeated application of Ag No_3 bead does not keep down. Considera-

ble amount of purulent discharge continues. Posterior sinus now healed.

Oct. 6. Region of M. E. filled with granulations except for small opening the size of pin head. This opening anteriorly reaches into region of M. E. Slight discharge continues from M. E.

Oct. 7. Discharged relieved to O. P. D.

August 6, 1912.

R				L
18				1
—		W		—
25				4
—		V		—
				40
14		AC	25″	0
—	F 512 V. S.	— —	—	—
10		BC	12″	3
	WEBER	F 256 V. S.		
N		LIMITS GALTON		N
80 V. S.		LOW	V. S.	2048

October 7, 1912.

R				L
18				1
—		W		—
25				12
—		V		—
				40
15		AC	25″	0
—	F 512 V. S.	— —	—	—
20		BC	12″	0
	WEBER <	F 256 V. S.		
N		LIMITS GALTON		N
80 V. S.		LOW	V. S.	2048

Vol. 35, page 103. Name, Elizabeth Taylor. Age, 21. Birthplace, Massachusetts. Residence, 22 Maher Road, West Medford, Mass. Occupation, nurse. Nov. 12, 1912. (Reentry.)

Diagnosis: A. S. o. m. s. ch. with recurrent mastoiditis.

Operation: Radical mastoid. Skin graft (primary). Dr. Jack.

History: A. S. Heath operation by Mr. Heath, August 7, 1912. Discharge 17 years previous to operation continuing to present. Operated on six years ago by Dr. Plummer. Since operation has had a continual M. E. discharge and a gradually progressive narrowing of canal.

Examination: Canal is almost entirely obstructed with newly formed tissue. One small opening is seen, through which pus of a mucopurulent character oozes. Slight tenderness over upper mastoid.

Nov. 20. Operation. Ether. Dr. Jack. Usual mastoid incision. Periosteum retracted. Cortex exposed and removed. Mastoid curetted out. Part of posterior wall was previously removed by Mr. Heath. Removal down to facial ridge completed. Small sinus leading to the dura over tegmen antri found. Antrum found and curetted. Ossicles removed.

Primary skin graft taken from right thigh, cut dry. Applied in mastoid cavity and sucked into middle ear. Held in place by a number of cotton pledgets. Wound packed lightly with iodoform tape and closed by four s. w. g. sutures. Thigh wound covered with cargile membrane and gauze.

Patient stopped breathing while coming out of ether, but recovered slowly.

Nov. 25. Stitches removed from posterior wound, also iodoform tape from axilla. Heart well compensated, and not enlarged pathologically. Urine negative.

Examination: A. S. shows well epidermatized radical cavity. Old scar over mastoid which is slightly reddened and swollen and tender in upper part.

Feb. 19. Operation. Ether. Dr. Jack. Incision in old scar. Old cavity exposed and well epidermatized in lower part. Cavity leading to dura filled with soft granulations. Dura normal. Grans. cleaned out. Wound closed entirely with four s. w. g. sutures. Iodoform gauze lightly packed into affected area through the canal. Dry dressing and bandage. Good ether recovery.

Feb. 23. Small granulation in bowl cauterized. Cavity looks well otherwise. Posterior wound doing well. Patient up.

Feb. 26. Doing well. M. E. still discharges, and granulations appear as above.

Feb. 29. Less discharge. Not many grans. seen now.

Mar. 1. Discharged relieved to Dr. Jack.

PART II.

Abstracts of the cases. The abstracts are grouped according to classes, and are not given in chronologic order. The following are the abstracts:

Case 1.—August 12, 1912. Margaret Donovan. White. Age, 6. American. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. S. Otitis media suppurativa acuta. A. D. Recurrent mastoiditis. Postaural abscess, A. D.

History: The patient was admitted to this hospital on Jan. 19, 1912 (i. e., eight months ago), suffering from otitis media suppurativa acuta and mastoiditis and postaural abscess A. D. A mastoid operation was done by Dr. Lothrop, the senior house surgeon, in which the abscess was incised and drained. The cortex was found to be perforated near the canal. The cortex was removed and all the soft cells curetted out. The antrum was found and curetted. The sinus was exposed but not opened. The patient was discharged on Feb. 1, 1912. The right ear was well until last Monday (one week ago), when the pain commenced and has lasted to date. There has been considerable discharge for the past three days. Mastoid tenderness has existed for four days, and swelling for three days.

Physical Examination: Negative.

Examination: On the right mastoid there is a scar of the previous operation. There is marked postaural redness, bulging and fluctuation. A small round perforation exists in the lower posterior part of the drum. Through this comes a profuse purulent discharge. The drum of the left ear is red and bulging and no landmarks are seen. Under primary ether the left drum was incised.

Aug. 13. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision. Pericranial flap cut. About half an ounce of pus escaped from under the periosteum. A small pin head perforation was found in the reformed lateral wall of the mastoid. The further steps of the operation were carried out in the manner usually followed by Mr. Heath.

Oct. 7. (One week short of two months.) The middle ear is dry. Most of the drum can be seen, and the antrum has been filled with granulations and its site is epidermatized.

April 26, 1913. (Condition today.) The mother says that the child left the hospital four months ago with the ear dry and that it has remained so. She notices no impairment in the girl's hearing.

Examination: Two scars are present behind the ear. One is one-half cm. behind the crease where the auricle joins the head and the other one-half cm. in front of this, and on the auricle. The incision on the auricle is the one made by Mr. Heath. In order to avoid the scar of the first operation Mr. Heath's incision was made either a little forward of the crease where the auricle joins the head or it has retracted into this position. There is no deformity of the crus helicus. The beginning of the cartilaginous canal is narrowed slightly at the top, but this is so little that it does not interfere with examination in any way. Within the canal and posteriorly and externally there is a slight excavation in the body of the mastoid. The cavity of the antrum has been obliterated flush with the annulus. The operative field is fully and firmly epidermatized. The bridge between the site of the antrum and the drum stands out clearly. The ear is dry. The whole of the lower posterior quadrant and half of the upper posterior quadrant of the drum is occupied by a thin atrophic scar. Two mm. in front of the handle of the malleus and parallel with it there is a thickened line of calcification about one mm. wide and four mm. long. The drum is not retracted. The drum of the other ear is slightly dull.

Hearing test:

April 26, 1913.

R				L
18				18
—		W		—
25				25
18		AC	25″	20
—	512 V. S.	—	—	—
15		BC	12″	10
		WEBER <		
N		LIMITS GALTON		N
96	SURE	LOW V. S.	SURE	96
64	?		?	64

Comments on this case.—This is the best result of the seven. It was a case of recurrent mastoiditis and recurrent postaural abscess. The case was first operated upon by the simple mastoid operation with posterior drainage, and then

by Mr. Heath with drainage only through the canal. The records do not show that the postaural abscess was at either time as large and foul as in the other case of mastoiditis and postaural abscess operated upon by Mr. Heath with less success. (See below.)

Case 2.—August 2, 1912. Joseph Weinstein. Single. Age, 21. Russian. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. D. Mastoiditis.

History: The patient has had a head cold for three weeks. With this he had pain in the right ear for one day. The drum was opened by his local physician, and the middle ear has discharged since. The pain stopped until two days ago, when it returned severely at intervals. There has been occasional headache and some mastoid tenderness.

Physical examination: Negative.

Examination: The mastoid shows considerable tenderness over the antrum and the tip. A profuse purulent discharge comes from the middle ear from a large irregular perforation in the posterior lower quadrant. There is a moderate amount of edema of the superior canal wall.

Aug. 3. Operation. Heath conserative mastoid. Operator, Mr. Heath. Usual Heath incision, etc. On the seventh day after the operation the temperature rose to 105° and remained above normal for a few days. No cause was found. About one month after the operation, the antrum was one-half obliterated by granulations. For about two months the end of the posterior flap and the edge of the superior canal wall where it was incised in the making of the flap projected into the canal and interfered somewhat with the after-treatment. At this time a note was made that the flap had gone back into place and that the incision through the crus helicis was healed without deformity and that the site of the antrum was represented by a slight dimple the cavity of which was well epidermatized.

Sept. 25. The patient has adenitis on the right side of the neck. This was treated with hot sulphonaphthol poultices. On the fifth day the right tonsil was removed. The patient did poorly under ether and the left tonsil was not touched. No point of infection was found.

Oct. 21. The adenitis is well, but the middle ear is still slightly moist. Two-thirds of the area of the drum can be seen. There is a small perforation in the lower posterior quadrant. The antrum is well epidermatized. The patient was discharged today to the Out-Patient Department.

April 26, 1913. Condition today, the patient did not report for examination.

Comment on this case.—The antrum was obliterated and epidermatized at the end of two months. Insufficient drainage through the canal was the probable explanation of the temperature for a short time a week after the operation and for the infection of the neck later. The ear was not dry at the end of two months. A test made a week after leaving the hospital showed no loss of hearing.

Case 3.—July 31, 1912. Frank Sapanari. White. Age 30. Italian laborer. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. D. Mastoiditis.

History: Two months ago the patient had pain below the right auricle. It soon went away. One month later the ear felt blocked. The patient came to the Out-Patient Department and had cerumen syringed out of both ears. At that time he had otitis externa diffusa in the right ear, and on July 2nd, 1912, the canal was incised. Six days ago the ear began to discharge and a day later the mastoid became tender and has remained so since.

Physical examination: Negative.

Examination: The external canal of the right ear is filled with a polyp. There is a purulent discharge from the middle ear. No part of the drum can be seen. Marked tenderness is present over the antrum and the tip of the mastoid and at the site of the emissary vein.

Aug. 4. The polyp was removed from the right ear in order to give better drainage.

Aug. 8. The patient was examined with nasopharyngoscope by Dr. Emerson. The examination showed a sharp spur on the right side of the septum, and the spur was in contact with the turbinates. The posterior ends of the inferior turbinates were large. The vault was congested, especially on the right.

Aug. 9. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision, etc.

Aug. 28. (Nineteen days after the operation.) The upper part of the skin incision has been healed for some time; the lower part has just healed. The incision through the crus of the helix has healed with gaping. There is a slight discharge around the rubber tube in the canal. There is a small tag at the middle of the superior wall. Inflation by the Valsalva method blows clear mucus through a perforation near the edge of the bridge. Zinc sulph. applied.

Sept. 27. The canal is narrowed a little externally. Superiorly a ridge projects from the canal wall. There is an opening into the antrum 2 mm. in diameter. From this comes a pulsating discharge. The drum is hard to distinguish. There has been a profuse purulent discharge from the middle ear until the last three days. Drops of boracic acid and alcohol solution were ordered to be put into the ear twice daily. The granulations were touched with a bead of nitrate of silver.

Oct. 10. (One week less than two months after the operation.) For the past few days the discharge from the middle ear has been less than before. The antrum, however, has not filled in.

Hearing test at entrance, August 3, 1912. No record of hearing test at discharge.

August 3, 1912.

R				L
1/6				18
—		W		—
25				25
5		AC	25″	10
—	512 V. S.	—	—	—
11		BC	12″	15
		WEBER <		
N		LIMITS GALTON		N
128		LOW		80

April 26, 1913. (Condition today.) This case did not report for a final examination. He came to the Out-Patient Department very irregularly. The last note was made December 16, 1912, four months after the operation. The note reads: The discharge from the ear stopped one month ago or three months after the operation. The cartilaginous canal

is slightly narrowed. There is no deformity of the crus of the helix. The operative excavation in the mastoid is represented by a slight bowl. The antrum is fully granulated and epidermatized. Only the lower third of the drum can be seen. The ear is dry.

No final hearing test is recorded.

Comments on this case.—At the end of a month the antrum had granulated in one-half, but at the end of the second month obliteration of the antrum had not yet been accomplished. However, judging from the last note, the antrum filled and became epidermatized somewhere in the third month, and the discharge stopped.

Case 4.—August 14, 1912. Louis Kaplan. Age, 2. American. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa acuta. A. S. Mastoiditis. Postaural abscess.

History: The child has had a discharge from the left ear for the past ten days. Swelling developed over the mastoid region six days ago.

Physical examination: Negative.

Examination: On the left side there is postaural redness, edema and tenderness. Palpation shows a well local postaural abscess. The drum is red and bulges posteriorly. No perforation is seen. There is considerable purulent discharge in the canal.

Aug. 15. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision, etc. A large and very foul postaural abscess was opened. This burrowed upward under the temporal muscles. Owing to the extent of the abscess it seemed to one of the writers (Dr. Mosher) that drainage through the canal only, as Mr. Heath proposed to provide for it, might not be sufficient. At the close of the operation he asked Mr. Heath about this, and Mr. Heath answered that he thought it might be sufficient.

This case did not do well. The superior canal wall hung down and the posterior flap sprang forward from the bowl of the mastoid excavation. Both the posterior flap and the superior canal wall became boggy and thick and practically blocked off the middle ear. The incision through the crus helicis spread widely so that it became necessary after a

week to withdraw the rubber drainage tube from the canal and to substitute a gauze wick. The skin incision healed, but on the tenth day broke open at the lower part. The ear continued to discharge both through the canal and through the postauricular opening so that about a week short of four months after the operation Dr. Jack reoperated the case.

Dec. 5, 1912. Operation. Radical mastoid. Operator, Dr. Jack. The incision was made close to the auricle in order to repeat the original incision. The remaining steps of the operation were those of the familiar radical mastoid exenteration. A small skin graft was placed in the cavity. The incision for the radical operation did not unite and the dressings were done from the postauricular opening.

Since leaving the hospital the child has been brought to the hospital once a week for treatment of the radical cavity.

April 26, 1913. (Condition today.) There is a large postauricular wound. The bowl of the radical mastoid cavity is packed with plain gauze, and a small iodoform wick fills the middle ear. On removing the wicks the bowl of the radical cavity is found to be well epidermatized. The antrum and middle ear, however, are not epidermatized, and small, flat granulations are present in the antrum. The middle ear is narrowed from above downward, so that one-third of its cavity has been lost.

No hearing test.

Comment: The natural comment on this case is that the drainage of the postaural abscess was insufficient, and being insufficient the case went on to a radical mastoid operation, whereas in most of such cases the simple mastoid operation and ample posterior drainage would have been all that was necessary. The radical mastoid operation produces a vastly greater loss of hearing than the simple operation. It should be borne in mind, however, that cases of this kind at times do badly and require more than one operative interference.

Case 5.—July 19, 1912. Russell Noyes. Age, 12. American. Service of Dr. Hammond.

Diagnosis: Otitis media suppurativa chronica. A. S.

History: About once a year for the past six years the patient has had a dischage from the left ear. This was accompanied by deafness.

Physical examination: The left ear shows a large perforation which involves the posterior half of the drum. The incudostapedial joint is exposed and is covered with granulations. The promontory is similarly covered. There is considerable purulent discharge. The right drum is atrophic.

July 29. Under local treatment the ear has shown no signs of improvement.

Aug. 12. Operation. Heath conservative mastoid. Operator, Mr. Heath.

Oct. 19. The house record reads as follows: "The antrum is granulated except for a cavity 4 mm. in diameter and 4 mm. deep. There is a very slight moisture in the middle ear. The anterior half of the drum is covered with granulations."

Dec. 28. (Four months after operation.) The last house record reads: "Considerable discharge. Slight moisture in the antrum, but antrum well epidermatized."

April 26, 1913. (Condition today.) Since leaving the hospital the mother says that the boy's ear was dry until two months ago. It is probable, however, that the ear has never been absolutely dry. The boy has been coming to the Out-Patient Department once a week for treatment, and drops of the usual boracic acid and alcohol solution has been used in the ear most of this time. According to the mother's story two months ago, after a shower bath at school, the ear began to run and discharged for two weeks. After the exacerbation attributed to the shower bath, the discharge was not noticed again until one week ago. The mother thinks that the operated ear falls away from the head a little more than the other ear does.

Examination: Both ears are large. There is a very slight lop ear on the operated side. The scar of the incision is in the crease where the auricle joins the head. There is a slight deformity of the crus helicis, i. e., the posterior half of the crus is a little smaller than the front half, and where the two join there is a very slight angular deficiency at the top and botom of the scar. The cartilaginous canal is slightly narrowed, especially superiorly, for 1 cm. inward. A good sized speculum can be made to pass the narrowing easily. Two drops of pus were wiped out of the canal. Where the posterior wall of the canal was taken down at the operation and an excavation made in the mastoid, no cavity now remains.

One-third of the antral cavity is obliterated, epidermatized and dry. On the superior wall of the canal half way to the drum a good sized polyp hangs downward. At the root of this the probe detects a spot of necrosis. The bridge between the antrum and the drum stands out clearly. The drum has no landmarks, and is thickened and covered with epithelial débris. In the posterior inferior quadrant there is a two mm. perforation. Through this when the patient practices inflation by the Valsalva method, soft granulations and pus are blown. Behind the perforation and on the edge of the annulus there are few soft granulations.

December 28, 1912.

R			L
18			15
—	W		—
25			25
36	AC	25″	17
—	512 v. s. — —	—	—
21	BC	12″	14
	WEBER <		
N	LIMITS GALTON		N
96	LOW LIMIT		96

April 26, 1913.

R			L
18			5
—	W		—
25			25
22	AC	25″	18
—	512 v. s. — —	—	—
15	BC	12″	13
	WEBER <		
N	LIMITS GALTON		N
64	LOW LIMIT	96 i. e. G.	

Comment: Some time between the third and the fourth month the antrum granulated in as much as it was going to and became epidermatized. The discharge lessened during the treatment, but the ear has never been seen dry at the hospital. If this case had been operated by either of the writers of this report a radical mastoid operation would have been performed. Eight months, of course, is a long time to have a radical cavity remain moist, but many of us have had such cases. The middle ear is still involved, and what the final outcome of the case will be is not yet clear. Since leaving the hospital there has been a marked loss of hearing, but

the hearing is better than one would expect from the appearance of the ear. As the antrum has been partly obliterated and is dry, it would seem that the ossicles were responsible for the continuance of the trouble.

Case 6.—August 5, 1912. Daniel Murphy. White. Age, 13. American. Service of Dr. Plummer.

Diagnosis: Effectus otitis media suppurativa chronica. A. S.

History: Acute exacerbation.

Three weeks ago the present attack started. Mastoid tenderness developed this morning, but there was no swelling. The patient gives a history of a similar attack one year ago.

Physical examination: Negative.

Examination: There is a profuse purulent discharge from the middle ear on the left. The drum is red but not bulging, and there is a small perforation in the lower posterior quadrant. The patient cannot blow air through the perforation. Moderate tenderness is present over the antrum of the mastoid but not at the tip. Neither redness nor edema is present.

Aug. 9. The patient has remained the same since admission. Mr. Heath saw him several times and advised operation. The tenderness is less. A profuse discharge continues from the middle ear. Transillumination shows a slightly light antrum and a dark tip.

Aug. 10. Operation. Heath conservative mastoid. Operator, Mr. Heath. Usual Heath incision and operation.

Aug. 28. The following note was made in the house records on this date. It is in some respects characteristic: "The upper third of the incision is granulating. The lower third of the incision is granulating also. The incision through the crus of the helix is healed without deformity. There is a moderate amount of pus about the rubber drainage tube which holds the canal open. The wick which passes through this is well saturated with pus. The inner end of the canal flap projects slightly. The anterior border of the canal flap and the roof of the canal project slightly. The antrum shows but a few granulations about the edges. The bridge is covered with granulations except superiorly. On the anterior

surface of the bridge there is a small rim of granulations which obscure the upper third of the drum. Inflation by the Valsalva method is successful, and mucopurulent discharge is blown from the middle ear." The typical part of this note consists in what is said about the granulations from the bridge and the displacement of the segments of the canal.

Oct. 4. The middle ear continues to discharge slightly. The antrum shows no signs of filling in.

Oct. 14. This note was made two months after the operation, when the patient was discharged to the Out-Patient Department. The condition of the antrum is the same as in the last note of Sept. 27, i. e., no tag or flap is present in the region of the antrum. The cavity of the antrum is represented by a hole 4 m. m. in diameter into which a probe enetrs. Today, October 14, "About one-fourth of the posterior half of the drum can be seen. The drum is red and granular. The bridge is granular and there is a slight discharge from the middle ear."

April 26, 1913.

Hearing Test at Entrance.

R			L
18			1
—	W		—
25			25
2	AC	25″	0?
—	— —	— —	—
13	BC	12″	13
	> WEBER		
N	LIMITS GALTON		N
80	LOW LIMIT		128

April 26, 1913.

Final Hearing Test Seven Months After Operation.

R			L
18			1
—	W		—
25			25
33	AC	25″	5
— 512 v. s.	— —	— —	—
18	BC	12″	18
	WEBER <		
N	LIMITS GALTON		N
64	LOW LIMIT		? 96-G

April 26, 1913. (Condition today.) The mother says that the cotton in the ear is always moist, and that the ear has

never remained dry for more than one week since the operation.

Examination: The scar of the incision is in the crease where the auricle joins the head. There is a slight deformity of the crus helicis with narrowing of the canal, especially superiorly, for 1 cm. inward. There is a small amount of secretion in the canal. There is no bowl in the mastoid corresponding to the operative excavation. The antrum apparently is not filled in at all, and the cavity of the antrum is moist. A crescentic fold of mucous membrane springs from the bridge and is parallel with it. This fold at the top measures about 1 mm. from before backward. There is a good sized perforation in the posterior inferior quadrant of the drum, while the remainder of the drum is thickened, boggy and without landmarks. Inflation by the Valsalva method is not successful, either through the drum, or through the aditus and antrum. A probe introduced into the antrum apparently enters the aditus.

Comments on this case: After seven months the antrum has not filled in. The middle ear is still moist and there is a great loss of hearing.

Case 7.—August 6, 1912. Elizabeth Taylor. Age, 21. American. Nurse. Service of Dr. Plummer.

Diagnosis: Otitis media suppurativa chronica. A. S. Exostosis of canal.

History: The patient has had pain and discharge from the left ear for the past seventeen years, following scarlet fever. Since the beginning of the discharge she has had much treatment. Since Aug. 4th of this year she has had occasional pain.

Physical examination: Negative.

Examination: About 1 cm. from the beginning of the external auditory canal, the canal is closel entirely by a diaphragm of fibrous tissue at the superior part of which over an area the size of a large pin head there is crusting. Through this area a probe can be passed into the middle ear.

Aug. 7. Operation. Heath radical mastoid. Operator, Mr. Heath. Usual Heath incision, etc. The exostosis was removed together with the posterior canal wall, and thus a new bony canal was formed. No ossicles were found in the middle

ear. (The presence of the exostosis made the finding of landmarks and the performance of the operation very difficult. Comp's.)

This case did not do well and was finally reoperated three months later by Dr. Jack.

Examination: The canal is almost entirely obstructed by newly formed tissue. A small opening is present through which pus of a mucopurulent character oozes. There is a slight tenderness over the upper part of the mastoid.

Nov. 20. Operation. Radical mastoid operation. Operator, Dr. Jack. Usual mastoid incision. Periosteum retracted, and the cortex exposed and removed. Mastoid cells curetted out. As only a part of the posterior canal wall had been removed by Mr. Heath, the removal of the wall was completed down to the facial ridge. A small sinus was found, which led to the dura over the roof of the attic of the middle ear. The lateral sinus was far forward. The antrum had not been opened in the operation of Mr. Heath. The antrum was found by Dr. Jack and curetted. The ossicles which were not found in the first operation, were located and removed. A primary skin graft was placed in the operative cavity.

Three months later the scar over the mastoid became reddened in the upper part and swollen and tender.

Feb. 19, 1912. Operation. Reopening and curetting of radical cavity. Operator, Dr. Jack. Incision in old scar. The old cavity was exposed and found to be well epidermatized in the lower part. The cavity over the middle ear which had been taken by Mr. Heath for the antrum, was filled with soft granulations. The dura was normal. The granulations were cleaned out. The wound was closed entirely, and iodoform gauze packed lightly into the curetted area through the canal.

Feb. 23. A small granulation in the bowl of the mastoid cavity curetted. The cavity looks well otherwise. The posterior wound is doing well.

Feb. 26. The middle ear still discharges. Granulations in the bowl.

Feb. 29. The discharge has lessened and there are not many granulations.

Mar. 1. The patient was discharged relieved to Dr. Jack. When last seen by Dr. Jack, the radical cavity was epidermatized and dry.

April 26, 1913. (Condition today.) The patient was out of town and answered by letter that she would report for examination when she returned.

The comments on this difficult case which the compilers would make are as follows: Before this case came to the hospital it was operated by Dr. Plummer and the exostosis removed. When Mr. Heath operated, the exostosis had returned. Mr. Heath's incision and partial removal of the posterior wall and the mastoid cells caused him to miss the antrum and to open the middle fossa, and to consider the operative cavity thus made as the antrum. A complete tympanomastoid exenteration became necessary at the hands of Dr. Jack. The primary skin graft put in by the second operator was in great part successful. The cavity above the attic of the middle ear refilled with granulations, did not drain and infected the upper portion of the scar. This necessitated the reopening of the radical cavity and a second curetting.

SUMMARY OF RESULTS.

The seven cases operated upon by Mr. Heath fall into the following groups: Two cases of otitis media suppurativa with mastoiditis; two cases of otitis media suppurativa acuta with mastoiditis and postaural abscess (one of these cases was recurrent); three cases of otitis media suppurativa chronica. Two of the seven cases required reoperation, i. e., one case of mastoiditis with postaural abscess which came to a radical operation, and one chronic case, the one that had the recurrent exostosis of the canal. This also came to a radical operation.

Of the acute cases two are known to be dry and to have the antrum filled in and epidermatized and to have whole drums. The shortest time in which the middle ear became dry was seven weeks. The acute case which ranks next had the middle ear dry, and the antrum obliterated and epidermatized somewhere in the third month. The third had the antrum epidermatized and dry in two months and a half, but the middle ear was still moist.

Two of the three chronic cases are still discharging after seven months. In the first of these the antrum is one-third obliterated and epidermatized; but in the second it has not filled in at all.

Of the two reoperated cases, the first one, the two and a half year old child with postaural abscess which ended with a radical, is two-thirds healed. The second, the one with the recurrent exostosis which required a full radical, is well.

The results as to hearing in the seven cases are as follows: In the first of the acute cases there has been no impairment; in the second the hearing was not impaired when the patient was discharged from the hospital; in the third, the last note says that the antrum was granulated flush with the annulus and epidermatized and that the drum was normal. In this third case, although there is no record of the fact, it is fair to presume that little if any impairment of hearing has followed the operation. In the fouth and last of the acute cases a radical operation was necessary, so that a severe loss of hearing has resulted. As the patient is only two and a half years old, no test has been made. Of the three chronic cases one shows a slight loss of hearing since operation, and one a large loss; whereas in the third case the patient was practically deaf in the diseased ear and probably shows but little loss. This case did not report for final examination. (See above.) A test made in the middle of her hospital stay and just before the radical operation, showed but a slight advance in the deafness. To sum up the hearing results, it can be said that in three of the four acute cases there was no loss of hearing. One of these cases required a radical operation and sustained a severe loss. In the chronic cases one had a slight loss, one a severe loss, and in the third, the ear was practically deaf and there has been but slight change for the worse.

The subject of the paper, as stated in the beginning, is "A Report of the Results of Seven Cases Operated Upon by Mr. Heath." With the preceding paragraph, therefore, this report has reached its logical end. There are other topics, however, which are vitally connected with the Heath operation that have not been touched upon. There is great risk if any of these are now brought up of spoiling the symmetry of the paper and of starting an avalanche of discussion. Notwithstanding this, the writers wish to continue for a few more paragraphs and to make some observation on the after-course of the operated cases. They hope in so doing that they do not offend. First of all it should be borne in mind in considering

these seven cases that they are relatively too few in number to draw hard and fast conclusions from them. Moreover, when a surgeon operates away from home and leaves the after-treatment of his cases to others the results are sure to be less favorable than they would have been had he finished the cases himself. A letter recently received from Mr. Heath called attention to this fact. Therefore, every allowance should be made. On the other hand, however, if Mr. Heath's operation is to be done by anyone except himself, the after-treatment must not be so difficult that men of average ability cannot carry it out. You may put me in that class if you like, but I will not permit my superior, Dr. Plummer, to be spoken of in that way.

So much for that point. Now for the others. The scar left by the skin incision of Mr. Heath, coming as it does in the crease where the auricle joins the head, is practically invisible, and is the best looking scar known to the writers. This is all that can be said in its favor, because by making the incision so far forward the mastoid is not sufficiently uncovered to get at all possible foci of disease. The tip of the mastoid and the lateral sinus are not easily dealt with through such an incision. When Mr. Heath was questioned about this, he replied that he always stood ready to make a supplementary horizontal incision. He did not find it necessary, however, to do this in any of the seven cases, in spite of the fact that in one of them he missed the antrum, and unknowingly and fortunately missed a forward lying sinus. Not only would the additional incision have helped greatly in this very hard operation, but if he had attacked the mastoid through the outer wall in the usual way, instead of through the posterior canal wall, as is his custom, the case would have been infinitely easier and probably more successful. Mr. Heath's incision through the crus of the helix gives a temporary widening of the cartilaginous canal which is very useful. It heals with little if any deformity.

For the first week after Mr. Heath's operation it is a surgical pleasure to look through the widely open canal and to see in the field, behind and above, the round opening of the antrum, and in front the whole of the drum, while between the glistening bone of the bridge stands out sharply. The pleasant impression produced by this is increased when one

looks behind the auricle and sees the almost invisible scar. One is impressed agreeably, also, by the fact that there are no wicks to be put in and taken out through a gaping posterior wound. Everything can be done through the canal. A bit later, when, in spite of all care, granulations begin to spring from the bridge the picture changes to a less pleasing one. Granulations bud from the bridge and from the posterior and the superior part of the anulus, and soon obscure a large part of the drum and dam back the discharge. At the same time, in some cases, the superior wall of the canal sags and the flap made from the posterior wall breaks from its moorings and projects forward into the lumen of the canal, obscuring the view and hampering the dressings. The segments of the canal will finally go back into place and the end results show that the extensive upset of the canal which occurs at the operation and continues for a time afterwards produces only a slight and insignificant narrowing. The most serious drawback in the convalescence of the cases is caused, as has just been stated, by the granulations which spring from the bridge and annulus, because they block off the drum, wholly or in part. In three of the four acute cases the antrum filled flush with the annulus, and epidermatized, and the ear became dry. But in none of the three was the time necessary to accomplish these results as short as is often the case when such cases are operated upon in the usual way. None of the chronic cases in our opinion did as well as they would have done had they been operated by the full radical mastoid operation with cleaning out of the middle ear. The serious defect of the Heath operation is that it attempts to deal with the mastoid process from an awkward angle, and through a restricted space, namely, the posterior canal wall. The operation has something about it of the nature of a stunt. It can be done and done successfully. The vital defect of the operation is insufficient exposure of the mastoid surface, and incomplete removal of pathologic conditions within it. Finally, and this observation brings up another point in connection with Mr. Heath's operating, we are under great obligations to him for reviving the question of operating early, both in acute and chronic cases, in order to preserve as much of the hearing as possible. Of late this reason for operating has fallen somewhat into the background. Mr. Heath has brought it

vigorously to the foreground again. The writers of this paper wish to acknowledge the stimulating effect of Mr. Heath's visit. They wish to praise his mechanical dexterity, and his generous personality, and to express their appreciation of the force of a man who could make the otologic world stand, we cannot say stand and deliver, for that is not quite true,—who could make the otologic world stand and reconsider.

IV.

THE BRONCHOSCOPIC TREATMENT OF SPASMODIC ASTHMA.*

By George F. Keiper, A. M., M. D.,

Lafayette, Ind.

The introduction of the bronchoscope for the removal of foreign bodies from the tracheal tree opened fields of usefulness for that instrument not thought of at that time, namely, the direct inspection of the trachea and the larger bronchi, and the direct application of remedies in certain lung troubles, as bronchitis and bronchial asthma.

Accidentally Nowotny,[1] of Krakau, observed that a case of bronchial asthma was favorably influenced by direct application, through the bronchoscope, of a solution of cocain or novocain in epinephrin. Galebsky and Tretrop,[2] of St. Petersburg, treated eight cases of asthma, producing lasting results in seven. Ephriam,[3] of Breslau, reported results on one hundred cases of asthma thus treated, eighty-eight of them remaining under his observation. Seventy-two were much benefited, and of these, forty-eight had no recurrence for from one and one-half to eighteen months after the last treatment. Sixteen received no benefit whatever. Of the latter, seven were treated but once. He used the following solution:

Novocain	0.2
Epinephrin (1:1000)	1.0
Normal saline sol	10.0

From 5 to 7 cc. were sprayed into the bronchus.

Ephriam did not use the bronchoscope for each application, but rather introduced a catheter into the trachea and through it introduced his medicines. This procedure is not new by any means, for as far back as 1838 Dr. Horace Green, of New

*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society at its meeting Feb. 22, 1914.

York, did the very same thing, using, of course, different remedies than epinephrin, then unknown.

Heilskov and Mahler[4] report thirty cases of bronchitis and asthma treated endoscopically. Six cases were completely cured, and eleven showed marked improvement. No benefit was obtained in the remainder. In all the asthma cases the patients experienced great relief. In all one hundred and twenty applications were made of a solution identical with that used by Ephriam. Ephriam's method of introducing a catheter into the trachea was followed in but a few cases.

Horn,[5] of San Francisco, reports a case that he treated with great benefit while at the University Laryngologic Clinic, University of Bonn, Germany, 1908-1909.

Freudenthal,[6] of New York City, reported that he had treated eleven cases successfully out of thirteen cases of spasmodic asthma. Eight were completely cured.

Large,[7] of Cleveland, reported one case in which he procured a cure after every possible operation was made upon the patient's nose and throat without avail.

This constitutes, briefly, the entire literature of the subject to date so far as I can ascertain. Enough cases have been reported to warrant in the future the treatment of desperate cases of spasmodic asthma through the bronchoscope, especially where all other measures have failed.

NATURE OF SPASMODIC ASTHMA.

That spasmodic asthma is a local affection and not a neurosis seems to be proven by the experiments of Auer and Lewis, who cut off all connection between the nervous system and the lungs, and yet were able to produce the paroxysms of asthma. Yet, as many cases of asthma have been cured by the removal of septal spurs, the amputation of hypertrophies of the middle turbinal bone, drainage of the nasal accessory sinuses, the regulation of the alimentary tract, the correction of uterine troubles, it is wise, in the milder cases at least, to relieve the patient of all possible conditions that might affect the patient reflexly. In other words, the bronchoscope is to be used after all other means have failed, or in desperate cases, like the one that I shall report, in which the patient need not wait for the treatment mentioned above.

OBSERVATIONS.

Several interesting observations have been made by those who up to date have reported cases.

Horn and Freudenthal report each a case where a scar-like mass obstructed the entire lumen of the bronchus. Local application of a twenty per cent solution of cocain overcame the contraction. In each instance this procedure was followed by a profuse secretion, so abundant as to compel Freudenthal to withdraw the tube. The secretion is liable to be profuse in any case after the withdrawal of the tube, as observed from Nowotny's experience to the present time. Great relief follows the expulsion of the secretion. Nowotny thinks that the relief experienced is due to that alone.

Spasm of the trachea and bronchi has been observed, so marked as to bar the further progress of the bronchoscopic tube or to compel its withdrawal. In some of these cases cocain and epinephrin would not suffice to relax the spasm.

Ulceration of the trachea and bronchi has been observed by Freudenthal.

Rhythmic contraction of the bronchus has been observed and in my own case so marked as to terrify one. It seemed as if a violent spasm was imminent.

As a rule bronchitis accompanies spasmodic asthma, and by the help of the bronchoscope we have opportunity to see how the mucosa of the respiratory tract appears, and if deemed necessary direct local treatment may be applied.

The mucosa of the tracheal tree may be so red and swollen as to hide the tracheal and bronchial rings from view. This appearance may lead one to doubt as to whether he is in the trachea at all. The breathing of the patient through the tube will, however, dispel any doubt as to where the tube may be.

Some of the cases are reported as cured by one application of the bronchoscope. How much suggestion had to do with the result no one can say. This much is true: the introduction of the tube released considerable secretion from the lungs, which secretion no doubt acted as a decided irritant to the mucosa of the respiratory tract, causing the spasm of the bronchi and bronchioles.

REPORT OF A CASE OF SPASMODIC ASTHMA SUCCESSFULLY TREATED THROUGH THE MEDIUM OF THE BRONCHOSCOPE.

William J. K., white, aged fifty years, fireman at the city pumping station, consulted me November 30, 1913, because of acute laryngitis. The examination had not proceeded far until symptoms of bronchial asthma manifested themselves. He stated that since the latter part of September he had suffered severely from asthma, having as many as three to five suffocative attacks every night. He was compelled to quit work. He had been in St. Elizabeth Hospital, under the care of Dr. Moses Baker, of this city. I communicated with Dr. Baker as to his patient's condition, and proposed the introduction of the bronchoscope and treatment through it because the patient was desperate for relief and willing to submit to any kind of treatment that might promise help.

He first consulted Dr. Baker on October 14, 1913, who, upon examination, diagnosed bronchitis, acute laryngitis and bronchial asthma.

The patient was a steady drinker. The only previous illness was "articular rheumatism" fourteen years before.

I quote some excerpts from Dr. Baker's record of the case:

"Eleven days ago he was in a draft and caught a cold. Since then he has been feverish, short of breath, coughs, raises white sputum, and has been sore in the chest. No chill."

"He is well developed and nourished. Temperature, 99°; pulse, 112; respiration, 24."

"Raises very tenacious mucus, which sticks to the inverted cup. On examination over the entire back are heard fine moist and sibilant rales."

"Treatment.—Calomel and salts. Codein, one-half grain at night. Syrup sedatole mustard plaster over chest. Taken from work and sent home to rest."

"October 20th: Patient greatly improved. Pulse, 100. Up and around. Allowed to work. Patient returns with original trouble. Cough is severe. Weather has been cold and wet. There is no fire where he lives. Patient sent to St. Elizabeth Hospital. Temperature, 99.5°; pulse, 100; respiration, 26. Many fine moist rales, and sibilant, over the back. Purged with calomel and salts. Codein administered together with inhalations."

"October 23rd: Patient improving. Rales remain in chest. Urine negative for albumin and sugar; no pus; orange yellow,

acid and clear. At 7 a. m., temperature, 98.2°; pulse, 76; respiration, 17. At 9 p. m., temperature, 99.4°; pulse, 90; respiration, 20."

"November 2nd: Chest symptoms much better and physical signs are disappearing fast. Patient allowed up in a chair."

"November 3rd: Temperature rose to 102.8.° Severe pain in the lumbar region. Typical herpes zoster at the region of the tenth intercostal nerve. Patient given urotropin, grains five, every four hours. Boric acid powder applied to eruption."

"November 5th: Pain very severe. Ichthyol ointment (50 per cent) applied to eruption."

"November 8th: Ichthyol ointment gave relief. Temperature, 101.°"

"November 22nd: Herpes zoster well. Temperature normal for ten days. Cough and other chest symptoms disappear."

"November 30th: Patient returns to office with typical asthmatic attacks." This is the date that I also saw him, and when I suggested bronchoscopy to him. He was advised to enter the hospital.

He entered St. Elizabeth Hospital for bronchoscopic treatment, which was delayed six days in order to replace the burned out lamp in my Kahler electroscope. In the meantime treatment was continued, which consisted in the hypodermic injections of epinephrin solution. Codein was given also, without relief.

On December 9th, early in the morning, before he had breakfast, his pharynx was cocainized, then his larynx. A hypodermic injection of three-eighths of a grain of morphin sulphate was also given. Then I passed a medium sized tube into the trachea to the first bifurcation. Through this I passed the extension tube to the second bifurcation in the left lung. The mucosa was much congested and swollen. When the second bifurcation was reached we could see rhythmic contractions taking place in the bronchus, almost closing it. After permitting the nurses and doctors around me to see this unusual sight, I withdrew the extension tube, leaving the outer tube in place at the first bifurcation, and through it I injected one gram of a two per cent solution of cocain in a 1:2000 solution of epinephrin, using a long tracheal syringe. This was deposited at the first birfucation in order to facili-

tate its distribution to both lungs. The treatment lasted twenty minutes. The tube was then withdrawn.

The patient experienced great relief, and in due time coughed up a great quantity of secretion. He did well thereafter for twelve days, getting nights of good rest without interruption. He also looked much better. On December 20th he had a very severe attack of spasmodic asthma at night. On December 22nd I again passed the bronchoscope to the first bifurcation and injected about one gram of the same solution as before. Again the secretion was profuse, and again he experienced great relief. To date he has had no return of the asthma. His bronchitis has also disappeared. He has resumed his work, putting in full time. He has gained in weight and strength. His temperature, pulse and respiration are normal. The only inconvenience that he suffered was a soreness in the larynx, which persisted in each instance for three to four days after the introduction of the tube.

This is but one case to report, but it is worth reporting for two reasons: (1) It confirms what has been observed in the comparatively few cases reported—that bronchial asthma can be treated locally through the bronchoscope; and (2) it may cause someone else who hears or reads this paper to try this method with possible great benefit to his or her patient.

The ordinary treatment of bronchial asthma via the alimentary tract permits but very little of the medicine ingested to reach the tracheal tree. Even then the chemistry of the body possibly so transforms the medicine ingested that it is changed into an inert product which will be feeble in action by the time it reaches the bronchi and bronchioles. Inasmuch as spasmodic asthma seems to be a local affection, it would seem to be the scientific procedure to treat desperate cases at least directly through the bronchoscope, as in the cases cited above.

REFERENCES.

1. Nowotny: Monatschr. f. Ohrenheil., 1907, 12.
2. Galebsky: Monatschr. f. Ohrenheil., 1908, 7.
3. Ephriam: Verh. d. II. International Laryng. Kongr., Berlin, 1911.
4. Heilskov and Mahler: Ugeskrift fuer Laeger, December 12, 1912.
5. Horn: Trans. Sect. Laryng. and Otol., Amer. Med. Ass'n, 1910.
6. Freudenthal: Trans. Amer. Laryng., Rhinolog. and Otolog. Society, 1911. Trans. Section Laryngol. and Otol., Amer. Med. Ass'n, 1912.
7. Large: Cleveland Medical Journal, June, 1913.

V.

VACUUM DISEASES OF THE MAXILLARY SINUS.*

By R. C. Lynch, M. D.,

New Orleans.

It is with a good deal of timidity that one presents to this society anything that might be construed as new, and while I am sure that many of you are fully acquainted with the possibilities of such a condition as a vacuum of the maxillary antrum, I have not, after diligent search through the literature, been able to find any reference to the condition other than a supposition, and so far am able to find no case reported.

Sluder, in conjunction with Ewing, before the Ophthalmological Society in 1909, discussing the nasal conditions in frontal headaches, mentions the fact that closure of the infundibulum will alter the air pressure in the frontal sinus sufficiently to produce discomfort varying from heaviness to dull pain, localized sharply in the frontal region. In his thesis presented to this society January 1, 1911, on vacuum nasal headaches with ocular symptoms only, he brings forth the nasal conditions that are found in this class of cases. No reference is made to the antrum as a possible cause of orbital neuralgia, however.

Brawley, writing in the *American Medical Association Journal*, 1907, says: "The frontal sinus and ethmoid cells opening into the infundibulum are the sinuses most often affected. It is almost impossible for this nonsuppurative condition to occur in the antrum, for its opening is at the lower part of the hiatus semilunaris and less likely to be blocked by the middle turbinate, or, if blocked, is opened by the varying turgescence of the turbinate."

Albert H. Andrews, in the *Journal of Ophthalmology and Oto-Laryngology* for March, 1912, refers to a nonsuppurative condition of the antrum, but associates with this free nasal dis-

*Presented as a candidate's thesis to the American Laryngological, Rhinological and Otological Society, December 1, 1912.

charge and the presence of more or less fluid in the cavity and of nasal polypi in the middle meatus.

The condition I wish to call your attention to is the production of a vacuum in the antrum not depending upon a previous recent inflammation in that cavity, and not associated with any marked nasal lesion, such as active suppuration, polypi or new formation. Truly a nonsuppurative condition and a noninflammatory one, there being no evidences of any inflammatory state in the nose, simply a condition of hyperemia, produced by the negative pressure, and being entirely relieved as soon as complete ventilation of the cavity is established.

That such a condition as a vacuum—even though nature abhors one—can and does exist in the accessory sinuses is attested by Sluder, Andrews, Brawley, and others, and the frequent example of closure of the eustachian tube with the production of a vacuum in the tympanic cavity, was shown long ago by Prof. Politzer. Granting then that this antral cavity is closed by some process in the soft tissues or bone, we have many examples to prove that the confined air will be absorbed in this cavity as it is in the ear.

It is a common experience for the general surgeon to meet with a localized emphysema, and to see the air in the tissues gradually absorbed. Gaillard, basing his opinion on twenty-two carefully observed cases of simple pneumothorax, says they recover in from ten days to two months, the confined air being rapidly absorbed by the healthy pleura. These absolute facts will leave no doubt in your mind as to the probability of the existence of a vacuum in the antrum, if the only means of ventilation of the cavity, namely, through the natural or accessory opening, is closed by some pathologic change, and the confined air absorbed by the processes referred to above.

While this closure may be accomplished by an acute tissue reaction to some invading infection, and may thus account for the headache that accompanies these conditions, the cases that form the basis for this article are all of the chronic, long-standing type, and it is upon them I wish to lay particular stress, for they are far more likely to be overlooked in a search for the explanation of the varied symptoms they present.

Of the fourteen cases that have occurred in my practice in the last eighteen months, I was unable to find any gross nasal lesion that would lead to an examination of the antrum. In two there was a malposition of the middle turbinate, with a

high deflected septum; the two others were incident to an atrophic fetid rhinitis.

It is possible that the hyperplastic changes described by Uffenorde and Skillern and others might easily extend sufficiently far down the nasoantral wall to involve the opening into the antral cavity, or produce some change in the lining membrane by extension through the fibrobony wall, accounting for the closure of normal and accessory openings in this way.

I am quite satisfied that the sinus was absolutely and permanently closed in all my cases, for I was unable to find any evidence at all of there being an opening, after the most careful search with probe, the use of cocain, adrenalin, antipyrin solution, with suction apparatus or the use of the Holmes pharyngoscope; so that whatever might have acted as an exciting factor to bring about this closure had completely disappeared before my examination. These patients all gave a history of a previous attack of rhinitis, but nothing that persisted long enough or seemed serious enough to be looked upon as an exciting factor.

The symptoms, diagnosis and treatment of this condition may best be embodied in the reports of those cases in which the various symptoms were most prominent.

My attention was first attracted to this state by the case of a young lady, nineteen years of age, the daughter of a physician. She was brought to my colleague, Dr. Henry Dickson Bruns, for ophthalmologic examination, suffering intensely from orbital neuralgia. This had persisted for six months continuously, there being no period during which she was free from pain. The most careful physical examinations revealed nothing. Urine, heart, kidneys, liver, lungs and vascular systems were normal. She was nervous from the persisting pain, but not emotional. Eye examination was absolutely normal, as reported by Dr. Bruns, and she was referred to me for nasal examination. A most careful search of the nose revealed nothing. Septum straight, turbinates free, meati and hiatus free, admitting a probe into the frontal and sphenoidal sinuses. But try as I might I could not enter the antrum, even after the use of cocain and adrenalin solution. X-ray and transillumination revealed nothing. No nasal discharge, and no dental tenderness. The antrum was only slightly hypersensitive on pressure near the base of the nasal

process of the superior maxilla, as compared to the opposite side. As a last report, I fortunately punctured the antrum with a Douglas trocar, and immediately there was relief. Irrigation revealed only a clear water returning, no pus, no thick mucus, no odor—nothing. I dismissed her, at a loss to know the cause. Later in the evening I saw her from curiosity, and, to my great surprise, found her to be absolutely free from pain. This continued for a week, when she returned with the same pain and discomfort. I made a large opening in the nasoantral wall through the inferior meatus, and again she was well, and has remained so to this day, sixteen months after operation. I could account for this sudden relief from pain, and its recurrence upon the closing of the artificial opening, and the relief again upon making a very large opening, only by the production of a vacuum in the cavity, the restoration of normal air pressure being sufficient to produce cure.

Case 2.—A young married woman, who had been treated by Dr. de Roaldes some years previous, came to me suffering from what was supposed to be hay fever, this, the first attack, coming in August. She gave an absolutely negative history, and an examination of the record of her previous visit showed an intumescent rhinitis, galvanocautery producing complete relief. In the early spring she remembered having a slight cold, otherwise nothing that could account for the sneezing. While the sneezing attacks were paroxysmal, she complained of a certain sensation of constant tickling in the nose on the right side, and said she would sneeze while in bed at night, just as much as during the day. She was nervous and somewhat pale because of this irritation, but otherwise suffered no pain. Nose was particularly free from pathologic change; there was no especial pallor or edema of the mucous membrane, no nasal blocking. Middle turbinate free, meatus free. Cocain, adrenalin and antipyrin application produced no subsidence in the irritation, and transillumination was perfectly clear. I could not enter the antrum with a small probe, though the other sinuses were free and easily probed. With a Holmes pharyngoscope I could see the greater part of the middle meatus, but I could see no point that might suggest an antral opening. The voice was flat and the sneezing or nasal reflex was absolutley confined to the right side, the left nostril being normal in every way. I had no difficulty in entering the antrum of the left side, and this fact made me puncture the right

cavity through the inferior meatus. Wash water perfectly clear. She experienced some instant relief, but was affected by the cocain, and I was inclined to accept this as the cause of her relief, especially since the washing showed nothing abnormal. By telephone later she said: "I don't know what you have done to me, but I am perfectly well and won't come down any more." About three weeks later she did return, suffering from the same symptoms, calling my attention particularly to the change in her voice. This time I made a large opening in the inferior meatus with trocar of my own design, and enlarged this opening still more with a Good raspatory and a Grunwald forceps. She still continues well and is perfectly willing to come occasionally to be sure the opening is patulous.

Case 3.—A man, about thirty-five years old, married, father of two children, both well and in good health, was sent to me because of persistent cough and continual facial neuralgia. Both he and his physician concluded that the neuralgia was the result of the cough, though careful physical examination could not account for either. His neuralgia was left-sided, and he said his cough felt as though it came from somewhere in the left side of his throat. He had, some ten years before, been treated for a nasal condition, remembering that a bone or something had been removed from his nose. He was not subject to cold and had not thought of his nose as a possible cause.

Nasal examination showed a slight high septal deflection to the left side, middle turbinate not making pressure on septum, and middle meatus free from secretion. Cocain, adrenalin and antipyrin failed to give any relief. Frontal and sphenoidal sinuses open, but I was unable to enter the antrum. I could not make a satisfactory examination with the Holmes pharyngoscope, but could see where a spur had been removed at some previous time. Suspicious of a vacuum condition, I used a suction apparatus, endeavoring to gain more information, though I could withdraw no fluid from the antrum. X-ray and transillumination added no more information. Teeth were not tender, but region of nasoantral wall seemed slightly hypersensitive by comparison. Epipharynx, tonsils, hypopharynx, larynx and trachea showed nothing that would explain cough or neuralgia. He was referred, however, to Dr. Bruns for ophthalmologic examination, who reported nothing but slight error of refraction, which was properly corrected

by glasses then in use. I could see nothing to account for his symptoms, except probably a vacuum antrum condition, and accordingly made a large opening into this cavity. Again I was surprised to note the almost immediate cessation of pain and cough, and he is still free from all recurrence of his distressing symptoms.

Case 4.—This patient had a Caldwell-Luc operation performed some five years ago, at the Eye, Ear, Nose and Throat Hospital in New Orleans. He came suffering again with all the symptoms of an antral empyema, and though I have never seen one of these cases recur, I thought this was to be my first experience. I could make no entrance to the affected antrum, however, through either the natural or artificial opening. Feeling sure that there was pus in the cavity, because of the pain referred to, the cavity, the toothache, tenderness, etc., I made a puncture through the inferior meatus and washed out simply clear water. His pain and all discomfort was relieved, however, and I can but conclude that the closure of the artificial opening was the means of producing a vacuum in the operated sinus, and consequently the pain and discomfort were relieved by simple ventilation. I had seen two cases of this class.

Case 5.—A case of atrophic fetid rhinitis had been under my care for a period of about six weeks, when he began to suffer from orbital and dental neuralgia. His was one of the cases of moderate atrophy with large scab formation. I had been using solutions of dionin in increasing strengths. I presumed at first that the absorption from the scabs was the cause of the orbital neuralgia, but this did not explain the pain in the teeth, especially since this was unilateral and the atrophy bilateral. The dionin produced some reaction after each instillation, but seemed only to aggravate the pain, though the scabs were decreasing. Daily visits and perfect nasal cleansing did not influence the pain. Cessation of the dionin produced no alteration of the condition. I was unable to enter the antrum, though all the other sinuses were perfectly patulous. Suction produced no change. Transillumination gave no further information. His dentist could find no cause for the toothache, so I punctured the antrum, with the complete relief of this orbital neuralgia and his toothache. Surely, nothing but this condition could exist, since wash water was clear, and the relief was immediate after puncture and irrigation.

I am rather inclined to think that the dionin produced here a hyperplasia of the nasoantral wall, and that the opening into that cavity, already small, was closed by the thickened hyperplastic change. Since this change has been noticed in other cases treated by this method, it is a perfectly plausible explanation in this instance.

Case 6.—An elderly lady of fifty-eight years was referred to me because of asthma. Her internist had made careful examinations of her organs and had regulated the caloric value of her diet. Medicine, diet and strict regime improved her physically, but her asthmatic attacks occurred as usual. She was referred to me for nasal examination. Nose was perfectly clear, there being a slight simple atrophy of the mucous membrane, but no accumulation of secretions and no deformity of the bony parts. I could see the sphenoidal openings, could probe the frontal sinuses and the left antrum, but the right antrum was closed. She had absolutely no localizing symptoms at all. False teeth of the upper jaw removed the dental source of irritation. Eyes were good and correctly fitted with glasses. General health fair. I cauterized the septum after the method of Francis. This produced absolutely no relief, not even to the then existing paroxysm. After a more careful study I noticed the change of the voice, though clear at times. I decided to open the right antrum. The water returned clear. The symptoms stopped promptly and now she has gained in weight and looks very well indeed.

Pain in the eye in the region of the nasoantral wall or in all of the teeth definitely localized; constant and not relieved by nasal applications of cocain-adrenalin-antipyrin, nor by headache powders; nasal reflex neuroses, as sneezing, asthma, cough, etc.; change in quality of voice to flat (nasal tone); inability to probe cavity when the other side is patulous; these symptoms, especially when unilateral, and coupled with negative nasal findings, negative transillumination and negative X-ray, must lead one to be suspicious of negative pressure condition.

No more pleasing condition can be imagined for the doctor to deal with, for the relief from symptoms that are usually harassing and severe can be obtained so decidedly and remain permanent that both patient and doctor will be more than willing to congratulate themselves upon the result.

VI.

INDICATION FOR THE LABYRINTH OPERATION, WITH REPORT OF EIGHT OPERATIONS AND SIX CASES IN WHICH NO OPERATION WAS PERFORMED.*

By Cullen F. Welty, M. D.,

San Francisco.

In this series of operations my indications for operative procedure were based upon the teaching of the Vienna school of otology, headed by Neumann, Alexander, Frey, Bárány, and Ruttin.

At this time, under certain conditions, a labyrinth operation was recommended when the acoustic or static labyrinth was intact, and many operations were done in such cases, usually with good results. About two years ago the attitude seemed to change in regard to operative indications, and at present the entire labyrinth must be destroyed before an operation is indicated.

In my series of eight cases, four presented complete destruction of the labyrinth, and in four the static labyrinth only was destroyed.

In one case the horizontal canal was opened from the fistula to the vestibule and the cochlea broken off—all the others were operated on by the complete Neumann method. No facial paralysis or other complication resulted, and all recovered. The cases not operated upon assume more importance, it seems to me, because they fulfilled the indications for operation according to either classification.

Case 1.—Female, aged twenty-one years. Had ordinary diseases of childhood. Acute suppurative otitis following scarlet fever at the age of eight years. The discharge continued uninterruptedly for two years. Adenoids were removed and drops used in the ear, which remained perfectly

*Read before the Pacific Coast Oto-Ophthalmological Society, July 1, 2 and 3, 1913, Portland, Oregon.

dry for one year. Since that time the ear has discharged more or less.

Examination.—Weber towards good ear. Schwabach somewhat shortened. Rinné, right ear, positive; slightly shortened bone conduction; left ear, negative; considerably shortened bone conduction; very much shortened air conduction. Right ear, whisper twenty-five feet; left ear, on contact. Acoumeter on contact. Right ear apparently normal. Left ear, caries of the attic wall with a fissure extending into same. Some granulation tissue about this fissure with a tendency to bleed on manipulation with a probe.

January 19, 1905, radical operation with closing by Koerner flap. Posterior wound healed by primary union. On removing the periosteum from the mastoid the bone was of a dark blue color. This was produced by the carious necrotic mass of the mastoid cells. The outside shell of bone was more porous than under normal conditions. The hammer and incus were almost destroyed by caries. There was a fistula posteriorly and below the facial nerve. However, it was curetted as well as possible by the use of straight and curved curettes. I wish to direct particular attention to this lesion, as I consider it wholly responsible for the symptoms that will be recorded later. The wound was dressed every second or third day. The patient complained of so much dizziness, headache and pain on the side of the head that she remained in the hospital for thirty days. I attributed some of the headache to a compound astigmatism, which was partially relieved by the continuous use of her glasses. While in the recumbent position she was not dizzy. When she assumed the erect position she would become very dizzy, and at one time she fell from her chair. This can be accounted for in but two ways: First, injury to the semicircular canals at the time of operation; second, to an infection which most likely took place by way of the fistula which I described before.

Twenty-four hours after operation she was reported by the nurse to be delirious. This happened two or three times in the course of as many days. She complained of headache and soreness about this side of the head, which gradually subsided. When she began to walk, her gait was that of a person with a fractured pelvis. She is a highly sensitive, hysterical woman, and I attributed part of the cerebral manifestations to her mental condition. The fundus was normal.

March 27, 1905. The ear absolutely dry, hearing improved.

May, 1905. Seropus began to discharge from this fistula and continued until September, 1905, at which time I again performed a curettement. The wound was treated antiseptically until November, 1905, when she was again discharged as cured.

Since the recovery from her primary operation she has had no cerebral symptoms of any kind.

March 21, 1906. Complains of intense headache over this side of the head, and dizziness a great deal of the time. The whole of the temporal bone on this side was tender to pressure. and the slightest percussion would elicit excruciating pain. At this time there was a serous discharge from this fistula, which in the course of two weeks disappeared entirely. The cerebral symptoms continued with acute exacerbations, at times so severe as to require morphin. Her pulse repeatedly reached 50, full and strong. She had some vomiting which was probably due to morphin. Examination of the eye, negative. Physical examination, negative.

At repeated consultations operation was recommended by all but one physician, who maintained that the condition was a nervous manifestation.

May 15, 1906. Patient entirely well. Cerebral symptoms entirely gone.

Diagnosis.—Serous meningitis. Infection by way of the fistula to the semicircular canals and the aqueductus vestibuli. This explains the cerebral symptoms that followed the primary operation, as well as those that followed in the later infection. During the first infection the cerebral symptoms were scarcely sufficient to warrant further operative procedure, because they seemed to improve almost daily after the second or third day. However, when we are confronted with cerebral symptoms later, and the only possible source of infection is by this fistulous communication, it must be admitted that it was by this route. Furthermore, the patient had an association of cerebral symptoms such as dizziness, headache and localized pain on the affected side, which is suspicious of cerebral complications, especially when all the mastoid cells have been removed. In the near future it will be considered conservative surgery to open and to explore.

My diagnosis prior to her recovery was different. At thi time I thought she had an extradural abscess or brain abscess.

with a decided leaning for an extradural abscess of the posterior brain fossa, infection by way of the semicircular canals and the aqueductus vestibuli. No doubt the infection traveled this route and was a nonbacterial invasion. I wish also to call attention to the fact that the fistula, which was discovered at the primary operation and which has apparently been responsible for the infection that followed, should have been destroyed entirely, at the sacrifice of the facial nerve, to remove all possibility of subsequent cerebral affection. Or is it better to trust to fortune, as I did in this particular case, and almost lose the patient?

Case 2.—Woman, aged twenty years, stenographer, had discharge from the ear since childhood, and frequent attacks of facial erysipelas, also repeated attacks of vertigo for several years past.

Examination.—No pain or sensitiveness on pressure or percussion; entire destruction of the membranum tympani; small granulation protruding from the attic. Whisper, three inches. Weber to opposite ear, marked adhesive process in the other ear. Rinné, negative. $C,^{1}$ positive; C, negative; $C,^{4}$ positive. Watch on bone, positive. Vertigo, positive. Tinnitus, positive. Spontaneous nystagmus, negative. Caloric reaction, positive. Hearing, seven-foot tube, whisper positive.

Operative Findings.—Caries of attic and antrum; dura uncovered to the extent of two thumb nails. Fistula of the oval window with a blackened margin about it, demonstrating that it has existed for a long time; a good sized probe was introduced into the fistula. Neumann plastic; grafts in the usual manner and wound closed.

First day after operation everything satisfactory; second day, some vertigo; third day, vertigo, nystagmus to the opposite side, vomited five times; fourth day, dressing removed; not so much nystagmus; patient vomited twice. Grafts all adherent.

During the four days the patient had no fever; the vertigo and nystagmus disappeared gradually. The patient left the hospital in ten days, well in twenty-eight days.

Observations.—My only careful examination of this patient das made nine months prior to operation. From the examination as made at that time the cochlea and canals were intact, so that a radical ear operation would not have been attended with risk to the patient's life; but when I found a fistula, and

an old one at that, I felt sure there would be induced an acute exacerbation of the old labyrinth suppuration. However, the patient made an uninterrupted recovery. This patient should have had an operation on the labyrinth at the time of the ear operation, or no operation at all.

I relate this case in detail to accentuate the importance of repeated examinations, if operation is delayed.

At the time of examination the patient heard whisper at three inches.

If my labyrinth instruments had been accessible, I would have destroyed the labyrinth at once; as they were not, I concluded the operation with a skin graft. The patient made a good recovery, which can be attributed to good luck rather than to modern otology.

Case 3.—Female, aged twelve years. Discharge from ear since infancy; frequent attacks of pain back of the ear; frequent attacks of vertigo. This last attack began three days ago. Acute exacerbation of the chronic suppurative otitis media; pain on whole side of head. Vertigo so severe that when she moved her head she would vomit. She said the pictures seemed to jump on the wall.

Examination.—Painful on this side of the head, and especially so over the mastoid. Marked nystagmus to the opposite side and to the same side. Nystagmus of the third degree. Meatus swollen to such an extent a clear picture of the membrane could not be secured. Weber to the good ear, Schwabach shortened. Watch on bone negative. The hearing test was positive, but not properly made. By the introduction of cold water into the ear we thought the nystagmus was increased. Hot water did not seem to influence it in any way.

The following morning a radical ear operation was done.

Operative Findings.—Large pneumatic mastoid; cholesteatoma; fistula of horizontal canal; facial uncovered just below fistula. Plastic operation completed.

The following day some additional fever. Beginning facial paralysis; headache. Second day, semicomatose; head retracted, neck stiff; meningitis; facial paralysis; absolutely no hearing; no caloric reaction. Advised immediate labyrinth operation, which was refused. Patient continued in this condition for a few days and began to improve. The facial paralysis recovered entirely. The ear continued to discharge; no hearing; no caloric reaction; the rotary test later positive

for a destroyed labyrinth. At my first examination I had misinterpreted the findings in regard to hearing and the caloric reaction.

According to all the rules of otology this case should have died of a purulent meningitis. The patient has had no ear symptoms since she left the hospital. The ear continues to discharge.

Case 4.—Female, aged twenty-four years. Acute otitis in both ears for two weeks past, following influen
past four days has had fever of 103½°; marked vertigo, nausea and vomiting.

Repeated incision of the drum membrane by family physician.

Examination by myself. Patient suffering great pain; temperature 102½.° Intense pain over the head and especially back of either ear; marked nystagmus to either side, more to the right. Would vomit when she attempted to move about in bed. Meatus on both sides closed by swelling; pus present. Operation on both ears was performed as soon as instruments could be secured.

Operative Findings.—Large pneumatic mastoid on both sides; dura uncovered on both sides in my effort to remove all carious bone. Operation completed.

The following day the temperature dropped to about 100°; not so much vertigo; no vomiting.

On the following day the temperature continued 101°; dressings changed and a wet bichlorid (1/3000) substituted. After four days of this wet dressing the temperature was 99 to 99½.° Very little vertigo. The dressings were made with dry gauze, and in the course of ten days she was about her room. Discharge from the ears stopped in a very short time following operation.

Three weeks following the operation the patient said to me that she did not hear. I could demonstrate with the tuning forks that she could not hear, which was verified by long speaking tube, noise apparatus, etc. Caloric reaction negative. Was free from vertigo in three weeks. The ear continued to discharge for about ten weeks. Undoubtedly this patient had a purulent labyrinthitis, which for some reason recovered in spite of her physician.

I neglected to make a more thorough examination because the apparatus for examination was not at hand, and I felt

that I could not put off operation to make a more thorough examination.

Case 5.—Male, aged seventeen years. Discharge from both ears since he was three years of age, following scarlet fever. This illness also destroyed his hearing. This case had the radical ear operation in 1907 on both ears, neither one of which recovered, but continued to discharge pus. At this time I was not familiar with the findings of the labyrinth in chronic suppurative otitis cases of deafmutes.

Three years later a labyrinth operation was necessary on the left ear because of such symptoms that called for immediate action. This ear is now well and has remained so since the labyrinth operation.

The right ear has discharged off and on, four or five times a year for four to six weeks. Treatment with antiseptics relieves the condition. No hearing at all: caloric reaction, negative: turning has no effect whatsoever.

It is readily understood how some of these cases are misinterpreted. Some were overlooked because of lack of the proper way of arriving at a definite conclusion, and others were not subjected to the proper examination because it was almost impossible to make it under existing conditions. However, the patients recovered, which is most astounding to me, a believer in the Vienna school of otology and its teachings: at the same time I am more skeptical than I was as to the serious nature of the labyrinth infection, and that meningitis usually goes by the route of the labyrinth.

On the other hand, only two of the six cases are free from discharge, and they may at any time have a labyrinth affection or an infection of the meninges by way of the labyrinth with sudden serious complications.

The four cases that had remnants of hearing or a slight reaction following the use of cold water are all cured and out of danger. This speaks for the more thorough operation.

I am of the opinion that the pendulum will swing back again and include as favorable for labyrinth operation such cases as have only remnants of hearing on the one side, and no caloric reaction, or vice versa; so long as they remain in the present stage, they occupy the same position in surgery as a chronic appendicitis.

Does it not seem obvious that this is rather a dangerous

condition to allow? They do not get well of themselves, and only progress to a more serious complication as time goes on.

The more I reason with myself the more I am convinced that surgical interference in the cases spoken of will yield the best good for the greatest number.

In regard to my reported cases, in the light of modern otology, they should not have recovered. I cannot reconcile myself to the fact that they survived. However, my leanings are strongly towards operation.

VII.

WHEN THE RADICAL MASTOID IS IMPERATIVE.*

By J. Clarence Sharp, M. D.,

New York.

It is now nearly twenty years since the first radical operation was performed for chronic middle ear suppuration. During this time great advances have been made in otology. By operation we are now able to cure many of those old middle ear suppurations, prevent the development of complications, and also to treat brain abscess due to otitic origin. The modern radical mastoid operation means the complete obliteration of all diseased bone, the throwing into one large cavity of the middle ear, aditus, antrum and mastoid cells, thereby giving the patient a chance to recover from a chronic suppuration. The imperative indications are:

1. Caries or necrosis of the petrosa during the course of a chronic middle ear suppuration.
2. Cholesteatoma.
3. Intracranial complications occurring during chronic suppurative otitis media.
4. Whenever during the course of a chronic tympanic suppuration an acute exacerbation with mastoiditis occurs.
5. Labyrinthine symptoms.

Caries and necrosis follow the destruction of the mucous membrane. This is true, whether the disease at first was a simple acute catarrhal trouble, or purulent from the beginning. As a result of this we have an inflammation of the periosteum, with death of the bone. This is because the nutrient arteries of the bone and the vessels supplying the periosteum rapidly obstruct the circulation. Depending upon the occluded vessels for nourishment, the periosteum or the whole bone becomes necrosed, when it is either eburnized or eroded by the surrounding pus. Any profuse discharge from the meatus which has existed several months must come from the

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middle ear, and it goes without saying that the drum membrane is either perforated or destroyed. It is very important in what part of the membrane the perforation is. If it exists in the superior and posterior quadrant, it generally means that caries of the incus has occurred, granulations will form, closing off drainage from the aditus. This causes the pus to find its way into the pneumatic spaces, setting up a periostitis with more or less destruction of bone. If we have along with this cholesteatoma, the danger is increased, because the pressure from the growing mass may cause the absorption of the roof of the antrum, the bone in the posterior fossa, or the capsule of the semicircular canals, thereby causing an epidural abscess, a diffuse meningitis, a brain abscess, a sinus thrombosis or an inflammation of the membranous labyrinth. In three cases which I operated upon last year, all three of the semicircular canals were distinctly outlined; in two of them the facial nerve was also exposed, and one had a fistula of the horizontal canal. All this was brought about by the absorption of the bony covering, caused by pressure from the cholesteatoma. We feel that in all cases of chronic suppuration of the middle ear, when cholesteatoma is positive, a radical operation is necessary to save the patient from a further extension of the disease.

Primary tuberculosis of the ear is more often met with in poorly nourished and bottle fed babies. It is generally located first in the mastoid cells. The infection probably comes through the blood, or by way of the mucous membrane of the eustachian tubes. It comes on with very little pain and runs such a rapid course that palliative treatment is of little use. In order to save the life of the patient a radical operation must be done.

In regard to secondary tubercular infection of the middle ear, this develops most frequently in patients with pulmonary tuberculosis, and seldom with tuberculosis in any other part of the body. It comes on gradually and with little pain, yet the destruction is very great. The wall of the tympanic cavity and antrum resemble macerated bone, the labyrinthine capsule becomes necrosed, and by this means the life of the patient is placed in greater danger. If the patient is not in the advanced stage of tuberculosis, a radical operation should be done as the only chance of stopping a necrosis and preventing development either of a suppuration of the labyrinth or a tubercular meningitis.

Of all the sinuses the sigmoid is the one most often affected by the purulent suppurations. We may have here a perisinus abscess that will give no symptoms, and then we may have only a small opening over the sinus plate, which, not giving good drainage, retains the secretions. This produces an inflammation of the sinus wall, with high temperature. As the inflammation continues we have the formation of thrombi which extend often to the bulb of the internal jugular, causing pyemia and death, if not operated upon in time. We may have, either alone or with a sinus thrombosis, an extradural abscess, which is found either on the dura covering the middle or posterior fossa. In the majority of cases it is caused by the direct exetnsion of the inflammation through the bone. The only treatment one can think of in such cases, when it is due to an old chronic ear suppuration, is radical operation and then the opening of the abscess.

Meningitis of otitic origin develops either after the formation of a fistula or from the inflamed external surface of the dura. It is a well-known fact that the dura is very resistant. If it were not so, we would more often have not only acute meningitis due to infection, but also to traumatism. The clinical picture of meningitis is not always the same, and often very difficult to diagnose from an epidural or brain abscess. As a rule, the disease begins with headaches, which are at first remittent, but in time spread over the entire head and become continuous. The patient may have continuous vomiting, sleeplessness and sensitiveness to noises. Lightly tapping the muscles calls forth an active reflex. The most prominent symptom which distinguishes this affection from all the other intracranial complications, and especially brain abscess, is the marked excitement which is made evident by screaming, springing from bed, trying to run away, picking at the bedclothes, etc. The course of otitic meningitis, whether due to acute or chronic middle ear suppuration, is a very rapid one, especially in children. If fluid from a lumbar puncture is cloudy, it points either to a purulent meningitis, a superficial brain abscess, or pus in the ventricles. The absence of coagulation fibrin in a clear fluid points to a serous meningitis. A meningitis may be diagnosed early in its course by means of the biochemic tests of the cerebrospinal fluid, as described by Kopetzky. Otitic meningitis runs, with few exceptions, a fatal course. In circumscribed meningitis, when

it is caused by an epidural abscess, a cure is not out of question if the source of infection is removed by operation.

Brain abscess due to otitic origin is very difficult and often impossible to diagnose. The difficulties presented by the differential diagnosis between brain abscess and the different forms of meningitis are apparent from the observation of patients during life, and by the condition of the brain found at postmortem examination. In a number of cases one is able to make a diagnosis of abscess in the temporal lobe by the aid of certain marked symptoms, such as aphasia associated with a localized headache in the parietal region, tenderness on percussion, and increased temperature in the affected half of the skull. The prognosis of brain abscess until within the last few years has been very unfavorable. If the diagnosis is made in time, all the dead bone which was the source of infection is removed, and the abscess opened, before the appearance of serious complications, it is often possible to obtain a cure in a number of cases.

That facial paralysis is not of more frequent occurrence in chronic otitis is no doubt due to the greater resistance of the bony canal, and to its having a separate blood supply. When we do have a facial paralysis complicating an old chronic middle ear suppuration, it is generally caused by necrosis due to cholesteatoma, and should be operated upon at once.

Of the chronic middle ear conditions, cholesteatoma no doubt causes most of the labyrinthine infections. Next in frequency is tuberculosis, and then scarlet fever. Before doing a radical mastoid, when no labyrinthine symptoms appear, a careful functional test should be made, in case the patient after operation should develop any signs of a labyrinthine inflammation. When we have labyrinthine complications, the infection reaches the labyrinth by way of the oval window, round window, fistula of one of the semicircular canals, generally the horizontal, or a fistula of the promontory.

When labyrinthine symptoms do appear, such as nystagmus, vertigo, vomiting, fear of going up or down stairs, with a tendency to fall to the side of the diseased ear, a careful examination should be made with the functional tests in order to decide whether a radical operation should be performed alone, or whether it is necessary to follow the radical operation by a labyrinthine operation.

VIII.

A NEW ESOPHAGOSCOPE.*

By Richard Lewisohn, M. D.,

New York City.

I presume that you may consider it somewhat unusual for a general surgeon to present before your meeting a new instrument for throat work. I have been interested for a number of years in the clinical and surgical aspects of diseases of the esophagus, and especially cancer. You know that diseases of the esophagus, since the introduction of the Sauerbruch chamber, are amenable to surgical interference. It is true, up to a few months ago all cases of resection of the esophagus for cancer have ended fatally. However, all the work done in Europe and in this country along these lines has not been in vain, and has, after many years of disappointing efforts, resulted in the first successful resection of an intrathoracic esophageal cancer by Dr. Torek in New York. To further the work in this special field, to be able to make the diagnosis of esophageal cancer in its very early stages, we need an instrument for examination which can be easily introduced without general anesthesia and without great discomfort to the patient.

The new instrument which I am going to present to you now was not constructed for those who have mastered the use of the straight tube. But I think, even in this audience of specialists, quite a number of you will agree with me upon the difficulties of the straight tube method, and therefore may be interested in seeing an instrument which simplifies esophagoscopy materially.

The new instrument was so constructed that it adapts itself to two main requirements: 1, the introduction is possible in the normal position of the head; and 2, the instrument is passed down in the longitudinal axis of the esophagus, and not at an angle to this axis. In regard to the first require-

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ment, the position of the patient during the introduction of the straight tube is a very uncomfortable one. We do not take into consideration the right angle normally existing between mouth and esophagus, but we try by hyperextending the head to convert this right angle as far as possible into a straight line. This procedure means a great discomfort to the patient. Why should we, however, adapt the patient to the instrument? I think it is much more logical to adapt your instrument to the patient, and in constructing my instrument I laid great stress on the point that during the whole examination the patient sits in normal position.

As to the second requirement, even if we hyperextend the head as far as possible, we do not convert the axis of the mouth and the axis of the esophagus into a straight line. Consequently, the straight instrument does not pass down in the longitudinal axis of the esophagus, but at a more or less obtuse angle. This is the reason why in a good many cases the passing down of the tube into the deeper parts of the esophagus is a difficult procedure. To overcome this difficulty I had to apply a new principle for the construction of the new model—the telescopic principle. By giving the esophagoscope a telescopic form, it is made possible to introduce the tube exactly in the longitudinal axis of the esophagus. Consequently, there is no pulling on the attachments of the esophagus and, therefore, comparatively very little discomfort and danger to the patient.

I shall try to be as brief as possible in describing the instrument. The instrument is rectangular and carries a mirror at the junction of the two arms for the purpose of light reflection. The horizontal part, which lies in the mouth, presents at its proximal end an illuminating arrangement somewhat like Brüning's. The telescope consists of six tubes, the diameter of which ranges from 10.5 to 15.5 millimeters. A long spring is soldered to the innermost tube, and with the aid of this spring it is possible to open the telescope to any required length and to close it after the examination is finished. A few small pins attached to the upper end of the tubes prevent this spring from protruding into the field of vision.

The uppermost tube presents at its lower circumference two metal guides which are of the greatest importance for the practical use of the instrument. These guides, which act as a kind of obturator, open the mouth of the esophagus automatically.

This leads us to the method of introduction of the esophagoscope. The patient sits in front of the doctor on a chair. You then ask the patient to bend his head slightly backward, and, depressing the patient's tongue with the left index finger, the instrument is introduced blindly. As I said, the instrument glides in automatically and anchors itself in the esophagus. As soon as that is done the patient puts his head forward into the normal position, which he maintains during the rest of the examination. You then push down your spring under the guidance of the eye and so open the telescope. After the examination is finished, you pull on the spring, close the telescope, and remove the instrument.

The mucus is aspirated through a rubber tube carried down to the bottom of the telescope. In order to give the tube its proper bend at the right angular junction of the instrument, it is guided through a metal tube with a kind of Albarran finger attachment. Experiments for the construction of a forceps are still under way. They have so far advanced that I feel assured of the possibility of constructing a forceps useful in every respect for this instrument.

I shall not take up your time with a detailed report of cases. Most of these cases examined I reported last year in detail in the *Annals of Surgery*. The view, inverted but not reversed, is a very good one. Dr. Chevalier Jackson, whose opinion in these matters is certainly authoritative, was kind enough to say at the recent International Congress in London, that in looking through my esophagoscope he had as good a view as he ever obtained through any esophagoscopic tube.

The comparative merits of this telescope and the straight tube can be decided upon only after my instrument has been in the hands of the profession for some time. The disadvantage of its complexity is to my mind fully compensated by the fact that its introduction causes much less discomfort to the patient, and owing to its construction it is connected with much less risk.

I have accepted the invitation of your president to report to you about this new model with the greatest pleasure, and hope that some of you will give this instrument a trial. I feel assured that the telescopic esophagoscope, though not meant to supplant the straight tube, will have a wide field of usefulness in esophagoscopic work.

IX.

A CASE OF CEREBELLAR ABSCESS WITH ATYPICAL SYMPTOMS—RECOVERY.

By Adair Dighton, F. R. C. S.,

Liverpool.

The following case, which recently came under my care at the Eye and Ear Infirmary, presents so many unusual points that I think it is worthy of record:

Mrs. T., aged thirty years, was admitted to hospital on May 7th, with a diagnosis of subacute mastoiditis on the left side. Temperature, 98°; pulse, 100. A history of six months' discharge was obtained, and upon examination a large perforation was found to occupy the position of the center of the left tympanic membrane. There was no nystagmus, the fistula test was negative, and the labyrinth reacted normally to the caloric test. As there was a lot of pain and tenderness around the mastoid process, and the superior wall of the auditory canal was sagging, I operated on the following day by Heath's method, and found a small sized mastoid antrum full of débris and situated high up. There was nothing whatever unusual noticed at the operation. The same evening the temperature rose to 103°; pulse, 92. This I thought was probably an operation temperature and took little heed of it. On the following day the temperature remained the same, also the pulse, and I ordered calomel, etc., to try and bring it down. Nothing had any effect, and on the sixth day after operation the temperature and pulse remained the same; there was no vomiting, no optic neuritis, no nystagmus, in fact, no symptom whatever except the temperature and pulse. The patient was in very bad condition, and it was evident that something would have to be done shortly. On the next day (the seventh after operation) a very faint nystagmus appeared, directed towards the left, the diseased, ear. I immediately tested the pointing-by test, and found that though the right hand reacted normally, the left hand persisted in pointing-by to the left. This was

the first sign of cerebellar abscess that had been present, and upon it I decided to operate again. This I did, and found an abscess occupying the left lateral lobe of the cerebellum immediately behind the ear. On microscopic examination this proved to be due to the pneumococcus in conjunction with a bipolar staining diphtheroid bacillus (Virol Research Laboratory). The patient made an uneventful recovery except for a slight attack of pleurisy, which immediately subsided under pneumoccoccic serum.

Now, the first point of interest in this case was the rapid rise of temperature, which, as the later history of the case proved, must have been due to the lighting up of a latent cerebellar abscess by the trauma of the mastoid operation. Spencer, of Colorado, in the *Annals of Otology* for June, 1912, reports a somewhat similar case of his own, and mentions a case of latent cerebellar abscess reported by Beck, which lighted up after a mastoid operation. These cases seem to me to point to a moral, and the moral is that we should avoid all trauma as much as possible in the mastoid operation. Of course, the ideal method is that of Lake, who uses hand gouges without a mallet; but there are some of us who cannot get on with these, and for us the moral must be that of Allport, who, writing in the *Annals* for June, 1911, makes a plea for the more careful sharpening of chisels.

The next point of interest was the lack of all the recognized symptoms of cerebellar abscess. The temperature was more like a meningitis, the pulse was not slowed, there was no optic neuritis, no vomiting, and if a faint nystagmus had not been seen, one would have almost been tempted to fall in with the latest invention of the physicians and call the case one of serous meningitis, whatever that may mean.

Lastly, and again referring to Spencer's paper, the characters of the abscess, in this case, agreed with those described by Spencer and Neumann as to the bacillary origin, and from examination it could be seen that the cavity was enclosed in a dense capsule.

I omitted to mention that the cerebrospinal fluid reduced Benedict's reagent before the second operation.

X.

BRONCHIAL ASTHMA AND THE RELATION OF NASAL CONDITIONS TO IT.

By W. J. Abbott, M. B.,

Cleveland.

The pathology and etiology of bronchial asthma are subjects which have been before the profession for many years. The earlier authors considered asthma as comprising all forms of dyspnea with wheezing; thus the dyspnea in cases of cardiac and pulmonary diseases, as also those due to conditions of the pleura and greater vessels, were included under one term. These various causes meant a series of subdivisions which varied according to the conceptions of the cause, seat and nature of the trouble. In 1682 Willis described the nervous character of some cases, and called attention to those conditions in which there was a spasmodic action of the muscles and nerves of respiration, calling the condition asthma convulsivum. With the advance in methods of physical diagnosis and the discoveries of Auenbrugger and Laennec, asthma became a more limited term, and it was shown that it was generally a symptom of some organic disease; and some authorities, particularly those of the French school, advanced the belief that there was no such disease as asthma. This latter idea was shown afterwards to be extreme, as at autopsies no organic disease could be found. Early in the nineteenth century Traube advanced his "fluxionary theory" as being the true explanation of the condition. Then for years this and the "spasm theory" held sway in various forms and combinations.

After these theories had been advanced and supported from evidence gathered at bedside and pathologic work, Reiseisen came to the support of the latter by the discovery of smooth muscular fibers in the bronchial walls. He traced them down even into the very small tubes. Kolliker supported this by

demonstrating them also in the bronchioles of 0.18 mm. diameter. Williams demonstrated that these could be made to contract by irritating the lung, and Longet subsequently found that they contracted by galvanizing the pneumogastric nerve. Romberg was a strong supporter of the spasmodic character of asthma, and Bergson in an essay in 1840 accepted the same idea. A valuable article by Hyde Salter, in which he also accepted the spasmodic theory, appeared in 1850. By this time the nervous element in this condition was coming before the students of the subject. In 1854 Wintrich, working with apparatus not very satisfactory, could not demonstrate the contraction of the bronchial muscle fibers, as first advanced by Williams and Longet, but Paul Bert in 1870, with better apparatus, confirmed their original work. Biermer follows as a strong advocate of the old spasm theory, and states his belief in a fluxion which is caused by the action of an irritant upon the exposed mucous membranes. The action of the irritant is explained by Riegel to be possible in three different ways; that is, it may cause spasm and fluxion, it may cause a catarrh which causes the spasm, or it may cause the spasm which causes the catarrh. Lebert, although accepting the idea of bronchial spasm, does not find it sufficient to cause the great inflation of the lungs, hence he adds that it must cause secondary spasmodic contractions of the diaphragm and of the respiratory muscles of the neck and chest. This meets its first opposition by Weber, who in 1872 revives Traube's fluxionary theory. He states that the condition is caused by the sudden swelling of the bronchial mucous membrane, due to the dilatations of its blood vessels through action of the vasomotor nerves, and in proof quotes von Loven's experiments, which show that the irritation of the sensory nerves is followed by a reflex engorgement in the region to which they are distributed. He also refers to the difficulty of nasal breathing which is often seen before and may continue through an asthmatic attack. This was also believed in by Stoerk, who had demonstrated the swelling of the mucous membrane of the trachea down to the bifurcation in these cases.

Up to this time the discussion seemed to be mostly centered on the question of what pathologic conditions existed to account for the attack, as it seemed to be pretty well accepted that the primary cause was a nervous one, the stimuli coming

either from remote organs and acting reflexly, or from the respiratory center in the medulla, or from the nerve in any part of its course. These latter two might be seen in cases of toxic conditions caused by lead, mercury, syphilis or malaria.

In 1877 Voltolini called the attention of the profession to the possibility of at least one cause being found in the nose, when he reported his case in which the removal of nasal polypi was followed by a disappearance of the asthma, only to return with the reappearance of the polypi. Similar cases were reported by Daly, Roe, Allen, Hack, Woakes, and others. It is interesting to note here the connection that was brought out between hay asthma (hay fever) and bronchial asthma, although Salter had insisted in 1850 that these two were merely stages of the one condition. The nasal conditions that were found in these were very similar, and the regions known as the "sneeze areas" and "cough areas," described by Francis and McKenzie, practically coincided.

From that time on the problem in asthma seemed to be to find the organ that was causing the irritation. In the event of no irritating condition being found, the asthmatic attack and the patient's general condition, with special attention to the nervous system, gave the indications for treatment.

A great deal of evidence has been produced, particularly in the last ten years, to prove the importance and frequency of conditions in the upper respiratory tract. This has tended to place more importance on the reflex theories and less on the theory of stimulation arising in the nervous system. The theories to account for the bronchostenosis are two, namely: swelling of the bronchial mucous or submucous tissues, due to vasomotor disturbances; and contraction of the finest bronchial tubes, due to a tonic contraction of the muscle fibers. The work done by Einthoven and that of Brodie and Dixon show that stimulation of the peripheral ends of the pneumogastric nerves causes a stenosis of the bronchial tubes, due to a contraction of the muscles fibers and not to any change in circulation. The work of Gay and Southard and of Auer and Lewis, confirmed by Anderson and Schultz, Biedl and Kraus and others, bring out the similarity in lung conditions in cases of anaphylactic poisoning and those in asthma, and prove that the changes in the lungs can occur when the central nervous system is cut off, as for example by curare, or when it is

totally destroyed This would mean that the nervous symptoms are not the predisposing fact that was previously felt to be necessary, but are rather a result of the toxic condition, or are caused by the strain and anxiety that would generally accompany any such severe attack.

The importance of this work and the light that it throws on the problem in asthma was brought out by Meltzer, who advanced this as the most satisfactory explanation of the facts which before have conflicted with any other theories. It offers an explanation of the pathologic changes and of the modus operandi of the asthmatic attack, showing how we may account for the swelling of the mucous or submucous tissues of the bronchi, as well as account for the bronchial spasm with the accompanying emphysema and the enlargement of the bronchial lymph glands (first demonstrated by Williams and Bremier in 1870, and recently found in radiographs of chests of asthmatic cases and offered as an explanation in some at least of the cases of bronchostenosis). The changes in the bronchial mucous membrane that are revealed by the bronchoscope in cases where the history has extended over some time might also be explained by the local changes which would naturally follow the congestion and swelling of the lining bronchial membrane and the irritation from which it suffers on account of the dyspnea. The presence of blood-stained secretion which is found in some cases would suggest breaks in the mucous membrane which might well continue to provoke trouble after the subsidence of the original cause, and would show why the treatments through the bronchoscope may be advisable or necessary after the primary cause has been removed. This explanation necessarily presupposes a peripheral cause for the trouble, and it is for the purpose of trying to lessen the field of possible causes that this paper is written.

It will be noticed that the literature since Voltolini's classic case of nasal polypi has been dealing generally with the various causes that might be found in the upper respiratory tract. These have gone through the field of pathologic conditions that might appear in the nose or nasopharynx, but the cases have varied so much that one feels at a loss when trying to get any clear understanding of the real cause unless the reflex theory is still tenable. However, it will be noticed that hypertrophic rhinitis, nasal polypi and ethmoiditis has been

mentioned as the most frequent causes, although recently the cases of deviations of the septum have been mentioned more often than previously. There is a question as to whether all of the given causes may not be related or in some way connected, that one condition could be found which would account for all or most of the cases. It may be well to call attention to the fact that recently many rhinologic authorities agree that all polypoid degeneration, especially if around the ethmoid bone, is due to ethmoiditis—or to quote MacDonald: "Recent authorities, St. Clair Thompson, Lack, Parker and Luc, agree in this view, and probably it is now generally accepted." This is the one condition that the writer feels may be caused by any of the other conditions that have been advanced as a nasal condition which might cause an attack of bronchial asthma, and the results of treatments or operations have tended to demonstrate the truth of this hypothesis. Conditions of empyema of the frontal, sphenoid or maxillary sinuses may cause a hypertrophy of the middle tubinate body—or let us say an ethmoiditis, as it has previously shown that they are probably the same. The same is also true of cases of adenoids, deviations of the nasal septum, or even of hypertrophies of the inferior turbinate body. This would solve one problem that has annoyed the rhinologist and has led even him to presuppose a neurotic condition as being an essential to asthma, and that problem has been to explain why so many cases of empyemata of the sinuses, adenoids or deviations of the septum occur without any asthmatic symptoms.

The writer has had thirty-four cases of bronchial asthma in the past three years in which the subsequent history has been followed sufficiently far to enable some statements to be made about the result. In reviewing these, many problems have presented themselves, some of which might be worth consideration. If the theory that an ethmoiditis is necessary to cause asthma be accepted, then one might wonder if all these ethmoid changes are of equal severity, or what conditions would be found if the condition in the nose falls short of causing an attack, or why in some more severe cases of ethmoiditis, where extensive polypi fill the nasal spaces, there is no asthma apparent. It is in the milder cases that we find an explanation of why we get a persistent, socalled bronchitis in cases of adenoids. Again, after some cases of acute rhinitis,

it will be found, as a rule, where there are adenoids and a bronchial cough, that there is also an ethmoiditis, and that the cough will improve just as fast, and no faster, than the improvement in the ethmoiditis. This explains why many cases of cough are improved and some are not, after an adenoid removal has been done. The same might be said of operations for straightening a nasal septum; for if the new condition is sufficient to allow a disappearance of the ethmoiditis by affording drainage, ventilation or whatever has been necessary, then the cough will also disappear in accordance with the progress made by the ethmoiditis. The writer has seen cases of socalled bronchitis clear up with marked rapidity when some adequate treatment has been made to affect the ethmoid condition. It is not to be supposed that all cases of bronchitis are caused by an ethmoiditis, but there are a great series of cases that have been so diagnosed that have resisted the regular treatment for bronchitis where an ethmoiditis does account for the trouble. In these the patient generally complains of a severe and persistent "cold in the head," with coughing spells which are more severe in the night and generally between midnight and four o'clock in the morning.

This question as to why we do not find asthma in all cases of nasal polypi is one for which the writer frankly admits that he can, at present, see no satisfactory explanation. However, it is interesting to note that in some of these cases where no asthma exists, a history of asthma or a persistent bronchitis could be elicited as preceding the first appearance of the catarrh which developed into nasal obstruction; and also in some cases after the removal of the polypi, where the pedicles were not cleared up, that a spasmodic bronchitis or slight attack of asthma has appeared. The history of cases of asthma where any other cause but an ethmoiditis has been given, has in the writer's experience cleared up gradually after the other condition has been removed, and as far as he has observed in his cases there is a parallel improvement in the asthma and the ethmoiditis. On the other hand, where the writer has diagnosed a case as having some other condition, the asthma disappeared at once when the ethmoid condition was removed, regardless of whether the other conditions were removed or not. In one of the writer's cases (a young American woman, aged twenty-six years) there was a slight eth-

moiditis with very slight hypertrophy below the left middle turbinate. She had suffered from violent sneezing for about six months (January to June), and at times an annoying cough that had been diagnosed as bronchitis had appeared. After operation the sneezing and bronchitis disappeared and did not bother her until one year later, when the right ethmoid became involved. She would admit no history of asthma, but after a short trip, on which she cought a cold, she had her first attack of asthma. She was seen two days later, when it was observed that her ethmoiditis was worse than when seen before the trip, and she had a slight asthmatic wheeze. After operation these disappeared and no trouble has arisen in the eight months since.

The findings of other men do not seem to be particularly at variance with this conception of the etiology of asthma being a toxic condition, and it is only in the matter of finding the seat of its origin that the paths deviate. For example, the work in idicanuria by Eustis suggests an autointoxication and treatment of the intestinal tract which theoretically ought to assist materially at least, even though we admit an ethmoiditis as the real cause. The work of Carmalt Jones in isolating the bacteria that seem to him to cause the trouble, and his results with vaccine that he prepared in the Wright laboratory, as well as results that have more recently been personally reported to the writer, by injections of mixed infection phylacogen (prepared by Schafer's method), would suggest that something of this kind somewhere in the body were at the bottom of the trouble. The constant findings in the writer's series, regardless of other conditions, seem to point decidedly toward this being the real seat of the trouble. In one case of the series (a Russian, aged thirty-seven years, who had difficulty in breathing, bronchitis and occasionally wheezing, since a child, but had had more trouble in four months before the first examination was made) no hypertrophy of the mucous membrane about the middle turbinate was found, but the bone of the posterior half was enlarged and interfered with nasal breathing. This was removed and then some polypi were found under the turbinate bone far back in the ethmoid region. When these were removed and some of the posterior cells opened, a recovery followed.

The question of what treatment is necessary to insure a

satisfactory result is one which entails a very careful examination and careful judgment of the whole condition. The writer feels that it is here that he, as possibly others, has failed, and that the successes of Francis and McKenzie with their light routine cauterization of the sensitive areas are to be explained. Any one who has tried to assist the various conditions of ethmoiditis to a satisfactory recovery will realize the difficulties, as in some cases a light cauterization seems to be all that is indicated, while in others a complete evisceration of the ethmoid—for example, the Ballenger operation—is necessary. Much can be done with a slight operation to provide drainage, if the patient can be seen frequently afterwards for treatments, but generally in cases that cannot be seen—for example, dispensary or out of town cases—a more radical operation is necessary. In the majority of the writer's cases the Uffenorde ethmoid operation has been done. This allows good drainage and opens the spaces to allow of subsequent satisfactory treatment, and interferes with the anatomy of the nose to a much less extent than other operations which involve a removal at least of all of the middle turbinate body.

The other conditions found in this series have been two cases of sphenoid, three cases of maxillary, one case of frontal empyema, one case of adenoids, and six of deviation of the septum that seemed to demand operation. In these, after the first ten cases, as a rule the ethmoid condition, being considered the most important, was generally treated first. In one antrum infection where the symptoms were not very severe, that condition was first treated, with the result that after it was pretty well under control the ethmoid and asthmatic symptoms began to improve. At present there is a case of sphenoidal empyema under observation. She had her ethmoid operation over five months ago, and has been free from asthma ever since, but still has the discharge from the sphenoid sinuses. These I hope to open soon, as the point in the case has been proven.

One might therefore conclude that:

1. Granting asthma as being caused by a toxic anaphylactic dose, at least a very large percentage of cases have a nasal origin.

2. Ethmoiditis is the most constant and probably a necessary condition in the etiology.

3. Other nasal conditions are the cause of the ethmoiditis.

4. Result and lesions in the bronchial tubes may need attention after the correction of the nasal conditions.

5. Any intestinal infection may help to aggravate the condition.

BIBLIOGRAPHY.

Reiseisen, F. D.: De pulmonis structura. Argentorati an xi (1803), v. 42.

Bree: A Practical Inquiry Into Disordered Respiration. Fourth edition, London, 1807.

Bergson: Das krampfhafte Asthma der Erwachsenen. Preisschrift X, 149 pp., 1850.

Wintrich: Einleitung zur Darstellung der Krankheiten der Respirations Organe. Handbuch d. spec. Path. u. Therap. (Virchow), Erlang. u. Stuttg., 1854.

Salter: On Asthma, Its Pathology and Treatment. London, 1860.

Gilbert: Quelques consideration sur la nature de l'asthma. Paris, 1861.

Biermer: Ueber bronchial Asthma. Samml. Klin. Vortr., No. 12, Leipzig, 1870. Inn. Med., No. 3, 39-58.

Leyden: Zur Kentniss des bronchial Asthmas. Virchow's Archiv., Band liv, 1871.

Voltolini, F. E.: Krankheiten der Nase. Breslau, 1888.

Weber: Ueber Asthma nervosum. Tagebl. d. Versammt. deutsch. Naturf. u. Aerzte, Leipzig, 1872, p. 159.

Riegel: Ziemssen's Pathologie u. Therapie. Leipzig, 1875. Band iv, 2, S. 282.

Stoerk: Mittheilungen über Asthma bronchial und die mechanische Lungenbehandlung. Stuttgart, 1875.

Traube: Zur Lehre vom katarrhalischen Asthma. Beitrage z. Path. u. Physiol., Berlin, 1878, iii, 360-363.

Frankel: Ueber den Zusammenhang von Asthma nervosum und Krankheiten der Nase. Berlin. klin. Woch., 1881, xviii, 217-238.

Daly: On the Relation of Hay Asthma and Chronic Nasopharyngeal Catarrh. Arch. Laryngol., New York, 1882, iii, pp. 157-161.

Roe: Nasal Disease a Frequent Cause of Asthma. Journ. Am. Med. Assn., Chicago, 1883, i, p. 295.

Hack: Ueber eine operative Radical Behandlung bestimmter Formen von Migraine, Asthma, etc. Wiesbaden, 1884.

Geddings: Pepper's System of Medicine, vol. iii, pp. 184-209.

McKenzie: Diseases of Throat and Nose. Am. Ed., vol. ii, Philadelphia, 1884, p. 357.

Bosworth: New York Med. Jour., April 24, May 1, 1886. Diseases of Nose and Throat. Vol. i, pp. 232-257, New York, 1893.

Bosworth: Asthma, etc., with an Analysis of Eighty Cases. Am. Journ. Med. Sciences, Philadelphia, 1888, N. S. xcv, pp. 246-257.

Dobell: On Asthma, etc. London, 1886.

Woakes: Nasal Polypus. 1888.

McDonald: Diseases of Nose and Throat. Second edition, 1893, p. 226. Hay Fever and Asthma. 1893.

Einthoven: Pflüger's Archiv., 1892, li, p. 367.
North: Jour. Am. Med. Assn., September 28, 1901.
James, Adam: British Med. Jour., May 9, 1903.
Sible: Wiener klin. Wochenschrift, January 22, 1903.
Francis: British Med. Jour., October 18, 1902. Asthma in Relation to the Nose, 1903. British Med. Jour., 1904, ii, p. 1234.
Thompson, St. Clair: Practitioner, 1904, vol. lxxii, p. 275.
Lack: Diseases of the Nose and Throat. 1906.
Luc: Tribune med., Paris, 1905, vol. xxxvii, p. 181.
Brodie and Dixon: Jour. of Physiol., 1903, xxix, p. 97.
Otto: Handbuch der path. Mikroorganism, 1908, ii, p. 255.
Rosenau and Anderson: Arch. int. med., 1909, iii, p. 518.
Goldscheider: Zeitschrift f. Aerzt. Fortblid., 1907, No. 23. Cf. Fortschrift d. med., 1908, No. 2.
Jones, Carmalt: British Med. Jour., 1909, vol. ii, p. 1049.
Eustis: New Orleans Medical and Surgical Journal, August, 1909.
Auer and Lewis: Jour. of Exp. Med., 1910, vol. xii. Also Jour. Am. Med. Assn., 1909, vol. liii, p. 458.
Anderson and Schultz: Proc. of the Soc. for Exp. Biol. and Med., 1910, vol. vii, p. 32.
Freudenthal: The Endobronchial Treatment of Asthma. Trans. of the Am. Laryn., Rhinol. and Otol. Soc., 1911, pp. 30-40.
Meltzer: Trans. Assn. Am. Phys., Philadelphia, 1910, vol. xxv, p. 66.
Newlin: Hare's Modern Therapeutics, vol. ii, p. 407.
McKenzie, Dan: Cl. Jour., London, 1910-11, vol. xxxvii, p. 190.
Abrams: New York Med. Rec., 1910, vol. lxxviii, p. 813.
Biedl and Kraus: Wien. klin. Woch., 1910, vol. xxiii, p. 385.
Gay and Southard: Jour. of Medical Research, 1908, vol. xix, p. 22.
Lehert: Klin. der Brustkrankheiten. Band i, Halfte ii, p. 438.
McDonald: Allbutt's System of Medicine, vol. iv, part ii, p. 32.
Heryng: Annales des Maladies de l'Oreille, 1886.
Liveing: On Migrain, Sick Headaches, etc. London, 1873, p. 360.
Aufrecht: Deutsch. Archiv. f. klin. Med., Bd. lxvii, 1900, p. 586.
Brodie and Russell: Jour. of Physiol., vol. xxvii, 1900-1, p. 92.
Galeksky: Klin. therap. Wochenschr., Berlin, 1910.
Von Schrötter: Wien. med. Wochenschr., Berlin, 1911, vol. lxi, pp. 130, 200, 285, 326.
Solow: New York Med. Jour., 1911, vol. xciv, p. 637.
Mathews: Jour. of Am. Med. Assn., vol. lix, No. 12, p. 1107.

XI.

A CASE OF RECURRING LARYNGEAL POLYPI WITH TETANY.

By R. Bishop Canfield, M. D.,

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August 22, 1912. Patient, Jacob H., two and one-fourth years old. Patient has been growing slowly more and more hoarse during the past six months. For the past week or ten days has been showing increased dyspnea. Since yesterday breathing has been labored. Cyanosis has been present for several hours.

Examination.—Well-nourished child, lying in its mother's lap, gasping for breath and showing marked cyanosis. Hurried physical examination showed pulse 160 and somewhat irregular, respirations irregular and gasping with great inspiratory dyspnea. Lungs show many small rales both forward and back; no superficial evidence of laryngeal struma.

Hurried tracheotomy.—A low tracheotomy was attempted, but on account of a large thymus this was abandoned in favor of a high operation. Following tracheotomy free respiration was established. The child was a week later transferred to the care of the laryngologist of its home city.

Nine months later the child was seen for the second time. The mother stated that the physician to whom the patient had been referred stated that the child would be obliged to wear the tube for the rest of its life, and that nothing more in the way of an operation would be of service. Consequently the tube had been allowed to remain in position for nine months without being removed, even for the purpose of cleaning.

Examination.—The tube was in position and through it respiration was somewhat labored. The tissues around the tube were naturally reddened and infected, and there was considerable mucopurulent discharge in the wound. Attempted removal of the tube for the purpose of cleaning it was accompanied by brisk hemorrhage. This was stopped with some

difficulty and the tube replaced. A day or two later the tube was removed and the trachea was examined through the bronchoscope. Granulation tissue and masses of papillomata were discovered, extending down through the trachea to the level of the lower end of the tube. These masses of tumor were removed and applications of absolute alcohol were made to the masses of tumor which filled the larynx. The child became daily more unmanageable and was discharged temporarily from the hospital still wearing the tube.

July 14, 1913, two months later, the child remaining unmanageable, a thyrotomy was done under ether and the tumor was thoroughly removed. It was discovered at this time that the tumor filled the region at the base of the tongue very completely and extended up over the epiglottis as well as downward to the tracheotomy tube. A scissor dissection was done and the base of the growth cauterized with alcohol. The larynx was then packed with iodoform gauze and the tracheotomy tube reinserted.

July 24, 1913, ten days later, tracheotomy tube was removed.

July 29, 1913, after having breathed satisfactorily through the mouth for five days, the child suddenly became dyspneic and the tube was replaced by the interne.

August 11, 1913, two weeks later, examination through bronchoscope showed larynx filled with edematous tissue, and a week later patient dicharged, with tracheotomy tube in place.

October 8, 1913, two months later, removal of tracheotomy tube and insertion of intubation tube. With the exception of once, when the patient coughed up the intubation tube, which was replaced by a larger intubation tube, progress of the case was uneventful for over two months.

December 13, 1913, two months later, on account of the fact that respiration through the intubation tube had been free for two months, it was decided to attempt its removal. By means of suspension laryngoscopy the larynx was found to be free of tumor and the tube to be clear. Following removal of the tube, respiration was free for several minutes only, after which edema following release of pressure closed the larynx. The child was replaced on the suspension apparatus and the intubation tube reinserted. The patient breathed perfectly for some minutes, after which the masses of edematous mucous membrane covered the top of the tube, on which

account the necessity of replacing the tracheotomy tube was apparent. This was done.

December 13, 1913, five hours later, after having reacted well from the anesthetic, the child complained of being cold and developed a tremor of the hands, arms and face, resembling a chill. His temperature was 103.8,° pulse 180, respiration 28 to 40, and he was sweating profusely. Within a couple of hours the tremor had developed into clonic convulsions, beginning in the face, with rhythmic opening and closing of the mouth. Immediately the face and arms took part, the thumbs were flexed upon the palms and the fingers flexed over the thumbs, but could be easily opened. Soon the legs became involved, the thighs were flexed upon the abdomen. So severe were some of the convulsions that the bed shook. The patient soon became stuporous. The convulsive seizures became more and more severe and frequent until they were practically continuous. After several hours of practically continuous clonic convulsions, the attacks became rather less severe. Between attacks he appeared totally oblivious to his surroundings, but could be aroused, and calcium lactate, grains six, four times a day, was ordered and gastric lavage was practiced.

December 14, 1913. For hours at a time the convulsions were practically continuous. Following them there were periods during which the child was comparatively quiet. Opisthotonos appeared and became marked. Stupor remained. Temperature, pulse and respiration remained high. Parathyroid extract, grains one, t. i. d.

December 15, 1913. Opisthotonos increased and an erythematous rash appeared over chest and face. The patient throws himself about in bed and usually lies on the left side.

December 16, 1913. Three days after the first tremor was noted, the convulsions lost their clonic character and became distinctly tetanic. From then on the case was plainly one of tetany. Trousseau's symptom, i. e., the production of the attack by compressing the venous trunks, was present though not very prompt. Chvostek's symptom, i. e., the production of twitching by tapping on the facial, could be elicited.

December 26, 1913. For ten days the attack persisted with the greatest severity. The tetanic convulsions were more or less continuous, the opisthotonos was marked, stupor was deep, temperature, pulse and respiration remained high, and the

child became gradually weaker, although nourishment was taken rather well. It became apparent that the child was blind or nearly so. The ophthalmoscopic report showed moderate optic neuritis with edema of the retinæ. Convulsions were not noted on the thirteenth day.

From then on the recovery was uneventful. The child gained in strength, vision returned slowly but steadily, until now it is apparently good, although the age of the child makes an accurate estimation impossible. The present condition of the child is satisfactory. He is still wearing the tracheotomy tube, but this will, I think, be removed without trouble in the near future. I had expected to take it out before this, but the mother took the child home temporarily, and is to bring it back again tomorrow.

With this case in mind, it is interesting to note Frankl-Hochwart's classification of tetany, which he divides into the tetany of adults and the tetany of infants.

Tetany of adults:

1. Epidemic tetany, rheumatic tetany, or shoemaker's cramp, sometimes considered as infectious.
2. Tetany of gastric disorders, which is very rare.
3. Tetany following poisoning from chloroform, ergot, lead, etc.
4. Tetany of the acute infectious disorders (typhoid, cholera, influenza).
5. Tetany during pregnancy.
6. Tetany following injury to the parathyroids.
7. Tetany of Basedow's disease, cerebral tumor, cysts of the cerebellum and syringomyelia.

Tetany of children, associated with gastrointestinal disorders, acute infections and rickets.

In the case under discussion we have apparently a severe secondary tetany following so soon after the operation that we must look for the etiologic factor in something associated with the operation. We have, therefore, to consider a toxemia from the ether or an injury to the parathyroids. The former cannot be excluded, although the child has taken the same anesthetic several times before without untoward result. I am not able to understand how the parathyroids could have been injured at the time of operation, although it is possible that a hemorrhage took place in this tissue during some of the manipulation.

XII.

ADENOCARCINOMA OF THE NOSE; CHRONOLOGIC REVIEW AND CASE REPORT.

L. D. Alexander, M. D.,

New York.

Primary carcinoma of the internal nose, of whatever variety, is of much interest, not only because of its rarity, but because of the importance of early diagnosis and radical removal.

Kümmel[1] in 1896 reported that medical literature up to that time furnished but forty cases.

Hopkins[2] in 1897 found in the records to which he had access, twenty-three cases.

Newcomb[3] in 1899 mentions Hopkins' statistics, abstracts four other cases, adds one of his own, a total of twenty-eight cases.

Carter[4] in 1907 had found ninety-eight cases. Since 1907 to date, reports of ninety-two other cases are to be found, showing that the influence of the appeals of the earlier authors as to the reporting of cases has not been in vain.

These two hundred cases of primary intranasal carcinoma, therefore, represent the total upon which conclusions can be based.

Carcinoma of the internal nose exists in many forms. In the order of their frequency[5] they are as follows:

1. Squamous celled.
2. Cylindrical celled.
3. Medullary form.
4. Adenocarcinoma.

Adenocarcinoma may be briefly defined as an adenoma which has undergone carcinomatous development, sections of which show a pernicious proliferation of the glandular cells, showing areas of confusion in their arrangement and resulting in penetration of the basement membrane.

The extreme rarity of this form is evident, for out of two hundred cases of intranasal carcinoma reported, only twenty-one are undoubted cases of this variety.

Because of its close relationship to the benign adenomata and myxomata, adenocarcinoma is of peculiar interest.

There prevails a divergence of opinion among the authorities as to the influence of operative procedure as a causative factor in the transformation of benign growths into malignant.

Thus, Wright[6] states: "Fully aware of the opposing views of many others in this matter, I am compelled to speak from my own experience alone. I have never seen in the nose and throat, where ablations of various growths are often made at repeated and long extended intervals, any evidence of a histologic change in type from the benign to the malignant, in either papillomatous or adenomatous growths."

Finder[7] comes to the conclusion that carcinomata and polypi frequently arise simultaneously, and that pedicled tumors of primitive form (carcinomatous) are clinically undistinguishable.

Citelli and Calamida,[8] on the other hand, believe that adenoma and papilloma frequently become carcinomatous, and quote their own cases in proof. They point also to the well-known fact of such transformation occurring in other parts of the body. They account for the rarity of adenocarcinoma as due to the rarity of adenoma in the nose, and believe that transition can occur and does so rapidly.

In the analysis of the appended cases one is struck with the number of cases in which "polypi" were diagnosed primarily. If the transmutation of benign neoplasms of the adenomatous and papillomatous forms is possible elsewhere in the body, then it is reasonable to suppose that such transformation can and does take place in the nose. Such is the author's belief. Aside from this transformation in nature, the usual causative factors of carcinoma as found elsewhere prevail here.

AUTHOR'S CASE.

M. A. S., aged fifty-five years, born in Ireland; single. March, 1912. Father, alive and well. Mother died, aged fifty years, of obesity. One sister, died of breast cancer at twenty-six years. Three brothers alive and well.

Past History.—Always healthy since childhood, except for occasional attacks of grippe. About a year ago began to have profuse discharge from right nostril, frequently using as many as twenty handkerchiefs daily; discharge gluey and at times blood streaked. Consulted physicians at dispensary, and had polypi removed at many sittings. In intervals of operations, patient would blow out fleshy masses. Always bled profusely during operations. Obtained much relief in breathing and diminution of discharge until nostril refilled. At no time has she had headache or pain of any kind.

Status Praesens.—Now three months since last operation. Seeks relief for stoppage of right nostril and discharge. Has lost forty pounds in twelve months and feels weak.

Objective Symptoms.—Poorly nourished, flabby, looks older than age given. No glandular enlargement. Right nostril completely occluded. A profuse mucopurulent discharge fills the nostril. On wiping this away, a pale growth, completely filling the naris, is noted. It is lobulated, streaked with blood, boggy, and bleeds readily when probed.

Cocainization and adrenalinization had little effect in reducing the size of the growth. Postnasally a sausage-shaped tumor, pink, pale and shiny, protrudes out of the right nostril, completely filling the chona of that side. It bends across behind the vomer and touches the left eustachian eminence. It partially occludes the left nostril, but interferes but little with respiration on that side.

Transillumination reveals a dark area below right eye and over three-fourths of the internal aspect of the antrum. Right frontal and ethmoid areas dark; left, normal. Exploratory puncture of antrum negative.

Growth probably arises from middle turbinate and adjacent regions. A section was obtained by snaring a portion of the growth through the left nostril.

Examination by Dr. E. E. Smith, who reported section to be adenocarcinoma.

Blood Examination (Dr. Smith).—Hemoglobin, 78 per cent; red corpuscles, 5,190,000; fibrin form, increased. White corpuscles, 12,420. Polymorph. neutrophiles, 71.2 per cent. Large mononuclear, 6.8 per cent. Lymphocytes, 20 per cent. Mast cells, 1 per cent. Eosinophiles, 1 per cent.

Hematologic Diagnoses.—Secondary anemia, slight hyperinosis and high physiologic leucocyte count.

Urine Examination.—Specific gravity, 1.020, strongly acid. Indican, trace. Acetone, trace. Urea, 11.62 grains per fluid ounce. Sugar, small amount. Microscopically urine showed mucus, calcium oxalate, small bladder cells, no casts.

DESCRIPTION OF OPERATION.

Operation, May 14, 1912. With the view of diminishing hemorrhage during operation and of reducing the blood supply to the region of the growth, the right external carotid was ligated just above the facial. An incision was then made, beginning just underneath the inner extremity of the supra-orbital ridge and extending downwards midway between the inner canthus of the eye and median line of the face for about two and one-half inches, the incision being curved in its lower portion outwards beneath the orbit. The periosteum was incised and elevated, separation being completed well back into the orbit. Entrance was gained into the ethmoid region by breaking through the orbital plate of the ethmoid. The orbital plates of the ethmoid and frontal and nasal process of the superior maxilla were removed sufficiently to give an excellent view of the ethmoidal and frontal regions. The frontal was found to be filled with a thick mucoid substance, and its membrane was markedly thickened, but no evidence of extension of the tumor to this region was found.

Both the anterior and posterior ethmoidal regions had been invaded by the growth, and the bone constituting the orbital plate of the ethmoid in its posterior portion was very thin, showing evidence of at least pressure from the growth. The growth filled the entire inferior, middle and superior meati. This growth was removed as far as possible, and the ethmoidal cells thoroughly eradicated, the entire ethmoidal labyrinth being removed. The sphenoid, except for the fact that its membrane was somewhat thickened, presented no evidence of the disease. This wound was packed tightly with iodoform gauze, and an incision was then made over the malar fossa of the superior maxilla, as for a radical antrum. The wall was very thin, and the antral cavity was filled with the growth. The growth presented a soft mass, lobulated, bleeding freely wherever lacerated. It could not be removed en masse, hence was removed in sections. The orbital floor about half way back presented an opening which was judged to be either a

dehiscence or the result either of pressure from the growth or of involvement of the bone. This opening was enlarged and all bone which presented evidence of disease was removed. The inner walls and mucous membrane of the entire antrum were involved, but the bone of the floor and posterior walls, as far as could be judged, were not extensively involved, though even after thorough curetting, the floor still had a velvety feel. The entire inner wall of the antrum was removed, including all of the turbinal tissues, the cavity of the antrum thoroughly curetted throughout its entire extent. The cavity was then tightly packed with iodoform gauze. The incision on the face was sutured with silk, no drainage being left in this region. There was markedly little hemorrhage throughout the operation.

Patient made an uneventful recovery and was discharged on the eighth day.

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
1890 (9)	Newman, D.	Male, 47. Chrome worker	Left nostril	Profuse serous; at times bloody	No	Inferior turbinate	Antrum	Adeno-carcinoma	Piece for examination	None	Death	No	
1897 (10)	Hopkins, F. E.	Male, 83. Tubercular family. Nativity not given	Left nostril	Copious mucous	No mention	Not stated	Entire naris	Polypi and myxoma	Rough removal at intervals by general practitioner	No operation because of age	Not stated	No mention	Author believes malignancy due to trauna of incomplete operation
1897 (11)	Saetta.	Female, 60.	Left nostril	No mention	No mention	Uncertain	No mention	Adenoma with carcinomatous degeneration	No details	No details	No details		

1897 (12)	Leland, G. A.	Female, 50. No family history	Right nostril (at night)	Profuse purulent	Right frontal pain	Ethmoid	Orbit septum antrum	Adeno-carcinoma	Piece for diagnosis	None	Death two months	Death from cachexia	
1898 (13)	Thorner, Max.	Male, 47. Farmer, U. S.	Left nostril 1 year	No mention	Moderate	Middle (meatus) turbinate	Left orbit, destruction of eye	Adeno-carcinoma	Removal many times, snare and curette		Death	Cachexia and meningitis	
1899 (14)	Newcomb, J. E.	Female, 61. U. S.. Negative family	Frequent head colds for many years, both	Copious, watery, hemorrhagic and offensive	No	Middle turbinate	Superior maxilla and hard palate	Adeno-carcinoma	Piece for diagnosis	Excision of upper jaw	Death one week after operation	Thrombi of coronary arteries	Author does not believe polypi became malignant
1902 (15)	Polyak.	Female, 66. No history	No details	No details	No details	Ethmoid region	Antrum and behind orbit	Adeno-carcinoma	Local curettage	Removed under ether	Alive when last seen		
1902 (16)	Citelli and Calamida.	Male, 52. Farmer	Right nostril 3 years	Purulent	No	Not stated	Orbit	Adeno-carcinoma	Piece for diagnosis	Refused	?	?	

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
903 17)	Page, L. F.	Male, 40. Negative family	Right nostril 3 years	No mention	Frontal headache	Middle turbinate	?	Adeno-carcinoma	Piece for diagnosis	Exenteration middle turbinate and ethmoids	No return		
903 18)	Cordes, H.	Female, 75. No history	Right nostril	Copious, bloody	Severe frontal	Not definite	Outer wall	Adeno-carcinoma	Piece for diagnosis	28 applications of cautery	No return after 9 months		Patient had erysipelas; radical operation refused.
904 19)	Dudley, Wm. H.	Male, 61. Negative family	Five years left	Purulent from antrum	Moderate	Left ethmoid and sphenoid	Orbit and all sinuses	Polypi adenoma adeno-carcinoma	Removal of polypi	Partial removal through orbital incision	Death after 2 years	All sinuses involved; cranial cavity eroded; no meningitis	Author believes that degeneration of polypi occurred

1905 (20)	McCoy, John.	Male, 47. Family negative	Right nostril	No mention	Frontal	Ethmoid	Frontal sinus, sphenoid and septum	Adeno-carcinoma	Removal and curettage	Modified Killian	No recurrence 1½ years		Author commends mode of operation
1905 (21)	Minor, C. L.	Female, 28. Cancerous family	Left nostril and later right	Profuse	No mention	Middle turbinate	Septum and superior meatus	Polypi and later adeno-carcinoma	Repeated removals	Radical curettage	No recurrence 1 year		
1905 (22)	Minor, C. L.	Female, 22. Moderate cancerous history	Both nostrils	Profuse purulent	No mention	Middle turbinate, both	Ethmoid	Polypi and later adeno-carcinoma	Removal, two operations	Exenteration middle turbinate and ethmoid	No recurrence 6 months		
1905 (23)	Fiocre.	Female, 63.	No details	No mention	No mention	Middle and inferior turbinate	No mention	Probable sarcoma	Removal, snare and forceps		No return 2 months		

CHRONOLOGIC TABLE.

Year	Reporter	History	Symptoms			Origin	Extension	Diagnosis	Operation		Termination	Autopsy	Remarks
			Obstruction	Discharge	Pain				Primary	Secondary			
907 24)	Hurd, Lee M.	Male, 59.	Left nostril	No mention	No mention	Antrum	Entire antrum	Adenoma, later adenocarcinoma	Ligation carotid, removal upper maxilla		No recurrence 1½ years		Author commends ligation of external carotid
907 25)	Pusateri.	Male, 60.				Right ethmoid	Antrum						Anatomic specimen
907 26)	Harmer and Glass.	1 case.											No history or details

08 7)	Klemptner, Louis	Female, 33.	Both nostrils 3 years	No mention	No mention	Right antrum	Ethmoid and middle turbinate	Adeno-carcinoma (glandular)	Denker antrum and ethmoid removal		No recurrence 6 months		No details; simply mention
10 8)	Gault.	No details.	Right nostril	No mention	No	Middle turbinate	Ethmoid and whole nose	Adenoma (epithelium) adeno-carcinoma		Ethmoid and middle turbinate removed	No recurrence 5 months		Details meager
12 9)	Alexander, L. D., Jr.	Female, 55. Sister died of cancer. Lost 40 pounds	Right nostril	Copious, gluey and bloody	No	Middle turbinate	Antrum and ethmoid	polypi and adeno-carcinoma	Many removals of polypi	Radical removal and carotid ligation	No return 6 months		Case shown at Academy of Medicine

SUMMARY.

Average age	53
Extremes	22-83

SEX.

Male	9
Female	10
Not given	2

SIDE INVOLVED.

Right	7
Left	7
Both	3
Indefinite	4

ORIGIN.

Middle turbinate	13
Antrum	2
Inferior turbinate	1
Uncertain	5

OPERATIONS.

Radical removal	5
Exenteration and curettage	9

TERMINATION.

Death	5
No recurrence	9
Lost sight of	7

Consideration of this summary shows that adenocarcinoma is essentially a disease of the cancerous age; and yet the two cases reported, one of twenty-two and one of thirty-three years, show that an early onset is possible. The influence of sex is negative, as is the side involved.

The predilection for the middle turbinal and ethmoid region, as evidenced in thirteen cases, is significant, in view of the imperfect surgery performed in that region.

Absence of pain, even when extensive involvement of adjoining structures has occurred, is a noticeable fact. The absence of lymphatic involvement is, I believe, more apparent than real. It will be remembered that the nasal lymphatics empty chiefly into a few glands situated around the eustachian tubes, another set placed in front of the cervical vertebra, still another near the cornu of the hyoid bone, while some again empty into the deep cervical lymphatics. The difficulty of palpation of glands situated as above is manifest.

PROGNOSIS.

In estimating the prognosis of adenocarcinoma and the success of the removal by operative procedure, there are several considerations necessary. In the opinions of the authorities, the outlook is most hopeless. Thus Carter states, "that there is no authoritative case on record where recurrence has not taken place after the operation, and often this recurrence has taken place before the patient has left the hospital."

I am unable to refute this statement by the recorded cases above, even though adenocarcinoma is the least malignant variety of all.

Of the nine cases radically operated upon, as given above, one, that of Hurd, had no recurrence in two years, and one, that of McCoy, none in three years. Of the other seven, I am unable to obtain information except as reported.

It is most probable that a future review of this subject will provide better statistics and better results. This will be accomplished by the routine examination of polypoid growths, leading to the early recognition of those showing beginning malignant changes, and the discovering of coexisting pedicled malignant growths. In spite of the meager results as evidenced above, I believe the early diagnosis and extensive and radical operative procedure now practiced will lead to a better prognosis in future cases of this form of growth.

CITATION OF CASES.

1. Kümmel: Handbuch Laryngol. und Rhinol., Bd. iii. 1900.
2. Hopkins, F. E.: New York Medical Journal, November 13, 1897.
3. Newcomb, J. E.: New York Medical Journal, September 9, 1899.
4. Carter, W. W.: Medical Record, Vol. xxi, 1907, p. 432.
5. Rosenheim, S.: Johns Hopkins Hospital Bulletin, Vol. xviii, 1906, p. 181.
6. Wright, Jonathan: The Laryngoscope, February, 1908.
7. Finder: Arch. f. Laryngologie, Bd. v, 1896.
8. Citelli and Calamida: Arch. f. Laryngologie, Bd. xiii, 1902-03.
9. Newman, D.: Glasgow Med. Journ., June, 1890, p. 469.
10. Hopkins, F. E.: New York Med. Journ, November 13, 1897.
11. Saetta: Arch. ital di laringol., Vol. xviii, 1897, p. 157.
12. Leland, G. A.: Transactions Am. Laryng. Assn., 1897-98, p. 80.
13. Thorner, Max: Arch. f. Laryngol., Bd. viii, 1898.
14. Newcomb, J. E.: New York Med. Journ., September 9, 1899.
15. Polyak: Pester Med. Chir. Presse, 1902, p. 630.
16. Citelli and Calamida: Arch. f. Laryngol., Bd. xiii, 1902.

17. Page, L. F.: Transactions Am. L. R. & O., Vol. ix, 1903, p. 237.
18. Cordes, H.: Berlin. klin. Wochenschr., February, 1903, p. 164.
19. Dudley, Wm. H.: Laryngoscope, September, 1904.
20. McCoy, John: Laryngoscope, April, 1905.
21. Minor, C. L.: Laryngoscope, December, 1905.
22. Minor, C. L.: Laryngoscope, December, 1905.
23. Fiocre: Rev. Hebd. de Laryngol., 1906-1907, p. 457.
24. Hurd, Lee M.: Annals of Otology, Rhin. and Laryngol., June, 1907.
25. Pusateri: Arch. Ital. d. Otol., 1907.
26. Harmer and Glass: Deutsch. Ztschrft. f. Chir., Bd. xv, 1907.
27. Klemptner, Louis: New York Med. Record, Vol. xiii, 1908, p. 311.
28. Gault: Rev. Hebd. de Laryngol., 1911, i, p. 437.

XIII.

THE SEMICIRCULAR CANALS AND THE FUNCTION OF EQUILIBRIUM.*

By Geo. E. Shambaugh, M. D.,

Chicago.

The semicircular canals have two well-recognized and more or less distinct functions. From these canals we get our sense of turning motions, but in addition the semicircular canals undoubtedly play a very important part in preserving the equilibrium of the body. This it accomplishes through what we designate as tonus impulses, which supply the skeletal muscles and keep them in a constant state of stimulation. To Ewald is due the credit of demonstrating the tonus function of the labyrinth. Various hypotheses have been advanced to account for such tonus impulses. Ewald, for example, believed that the hairs of the hair cells of the cristæ project free in the endolymph, and that they are in a constant state of ciliary motion, which in turn result in constant stimulation of the hair cells and the production of a constant stream of tonus impulses to the various skeletal muscles. This hypothesis of Ewald was, of course, based upon a faulty conception regarding the structure of the end organ in the semicircular canal. The hairs do not project freely in the endolymph, but are covered over by a superimposed structure called the cupula.

Breuer was a student of the anatomy of the labyrinth and understood the relation between cupula and hair cells. Breuer believed that the tonus impulses emanate from the hair cells of the cristæ. His idea of the stimulation of the hair cells was that this stimulation resulted from displacement of the cupula on the crista as the result of impaction of endolymph currents. In order, therefore, to account for the existence

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of constant tonus impulses, Breuer was forced to assume the existence of constant currents of endolymph. He seemed to have an idea that these endolymph currents could be accounted for from the constant replenishing of endolymph. He believed that the endolymph flowed from the membranous labyrinth directly into spaces containing cerebrospinal fluid. Of course, we know now that there is no communication between the endolymph and the brain cavity, and there seems to be no reason for supposing that constant endolymph currents exist.

Bárány believed that tonus impulses to the skeletal muscles are derived from tonus centers located in the region of Deiter's nucleus. Two such centers exist: one stimulating the muscles producing motion toward one side, the other stimulating the muscles producing motion toward the opposite side. Now, the tonus of these centers is, according to Bárány, in part automatic, but in part also is kept up from a constant stream of tonus impulses passing to these centers from the vestibular ganglion, located in the meatus acusticus internus. The tonus of this ganglion is in turn kept up by impulses emanating from the hair cells of the cristæ. What keeps up the constant stimulation of the hair cells to supply this tonus Bárány does not suggest.

My own conception of the origin of labyrinth tonus is that these impulses emanate from the hair cells of the cristæ and that they are the result of a constant stimulation. Now, the normal stimulation of the hair cells of the cristæ is brought about by the impaction of endolymph currents against the cupula, resulting in an interaction between the cupula and the hairs of the hair cells. I am inclined to believe that this is kept up in the labyrinth by the pulsations associated with each beat of the heart. With each pulsation there must be a rise and fall of intralabyrinthine pressure. There are several openings leading from the labyrinth; the aqueductus cochleæ, the aqueductus vestibuli, the oval and the round windows. With each increase and decrease of intralabyrinthine pressure there must result a slight to-and-fro motion of the endolymph, which would be sufficient to keep up a constant stimulation of the hair cells on both sides of each crista.

The clinical phenomena which result from a unilateral disturbance of labyrinth tonus are: First, an increase in tonus

from the affected labyrinth, producing nystagmus toward the same side. Second, a complete suppression of tonus in the affected labyrinth, resulting in a nystagmus toward the opposite side. Third, an intracranial irritation, producing nystagmus again toward the affected side.

In order to understand these phenomena resulting from disturbance of labyrinth tonus, it is necessary that one keep distinctly in mind a few fundamental facts regarding the physiology of these canals: First, the impulses from each canal stimulate only those muscles the movements of which lie in the plane of this canal. Second, a motion of endolymph in one direction in a canal stimulates only those hair cells on the side of the crista receiving the impact. In order to stimulate the hair cells on the opposite side of the crista, an endolymph current in the opposite direction is necessary. Third, an endolymph current in one direction in the canal stimulates the muscles which produce movement toward one side; an endolymph current in the opposite direction stimulates the muscles which produce motion in the opposite direction. Take, for example, the muscles controlling the movement of the eyes: an endolymph current in the horizontal canal, from the canal toward the vestibule, stimulates the muscles which produce nystagmus toward the same side, and an endolymph current from the vestibule toward the canal stimulates the muscles which produce nystagmus in the opposite direction. Fourth, it has been demonstrated by Ewald that a greater stimulation results from an endolymph current in one direction in a semicircular canal than in the opposite. For example, in the horizontal canal a greater stimulation results from a movement of the endolymph in the canal toward the vestibule, while in the superior and posterior canals the greater reaction results from an endolymph current from the vestibule toward the canals. Fifth, in all three of the semicircular canals the greater response is obtained from those endolymph currents which stimulate the muscles producing nystagmus toward the same side.

From each semicircular canal, therefore, emanate impulses producing nystagmus in either direction; the stronger impulses always being those which produce nystagmus toward the same side. With these facts in mind one can readily understand why the first symptoms that arise from an exten-

sion of an inflammatory process into the labyrinth produce nystagmus toward the same side. The first pathologic change is a congestion. This congestion increases the intralabyrinth pulsation on that side. This increases the tonus from the hair cells on each side of the several cristæ. The stronger impulses emanating from the hair cells which produce nystagmus toward the same side overbalance the normal tonus impulses from the healthy opposite ear. In the same way one can explain why a complete suppression of tonus impulses from one labyrinth produces nystagmus in the opposite direction, because the tonus from a normal labyrinth stimulates more forcibly those muscles producing nystagmus toward the same side. Supposing now that a labyrinth has been completely destroyed and an extension of inflammation takes place, irritating intracranially the vestibular nerve: the result would be exactly the same as a stimulation of the end organs in the labyrinth; that is, an increase in the tonus producing a nystagmus toward the same side.

With this conception of the physiology of the semicircular canals we have a very simple and plausible explanation for the clinical phenomena observed in applying the rotation test in cases where one labyrinth has been destroyed. In these cases we observe that the duration of the after-nystagmus toward the normal ear is much longer than the after-nystagmus toward the affected side; the reason for this being that when the patient is rotated toward the affected side, on stopping rotation the inertia of the endolymph in the horizontal canal of the normal ear stimulates the hair cells on the canal side of the crista. This, as we have seen, is the more sensitive side of this crista, and is the side which when stimulated produces nystagmus toward the same side. On the other hand, if the patient is rotated toward the normal side, on stopping rotation the inertia of the endolymph produces an impaction on the vestibular side of the crista in the horizontal canal of the normal ear; in other words, a stimulation of the group of hair cells which, when stimulated, produces nystagmus toward the opposite side. This side of the crista being much less sensitive than the canal side, the after-nystagmus toward the affected side is much shorter.

With Bárány's hypothesis of tonus centers, the following explanation for these phenomena in the rotation experiment

has been offered: The impulses from the semicircular canals on one side influence only the tonus center which produces nystagmus toward the same side. According to this hypothesis it is assumed that an endolymph current in one direction in the canal stimulates this tonus center, while an endolymph current in the opposite direction in this same canal depresses this center. In the horizontal canal, for example, an endolymph current from the canal towards the vestibule stimulates the tonus center which produces nystagmus toward the same side, whereas, an endolymph current from the vestibule toward the canal depresses this tonus center.

In a unilateral destruction of the labyrinth, in order to get any after-nystagmus toward the affected side when applying the rotation experiment, it is necessary to assume that the tonus of this hypothetic center must continue to act indefinitely after its labyrinth has been destroyed. This does not appear to be probable. When the end organs in a labyrinth have been destroyed, one would expect that the tonus of the center for this labyrinth would also die out.

Let us suppose that the right labyrinth has been destroyed. If the patient is now rotated toward the left, on stopping rotation there will be an impact of endolymph in the left labyrinth, on the vestibular side of the crista in the horizontal canal. The impulses from this side of the crista pass to the tonus center which produces nystagmus toward the left. These impulses being inhibitory, depress the tonus of this center. But on stopping rotation in this experiment we get an after-nystagmus toward the affected side. This can only be explained by the continued action of the tonus center on the opposite side, i. e., on the side where the labyrinth has been destroyed.

XIV.

SYPHILIS OF THE EAR.*

By Otto J. Stein, M. D.,

Chicago.

Syphilis of the ear is an old knowledge, recognized in the early history of this disease, but the epoch-making discoveries of Schaudinn, in 1905, of the spirocheta pallida as the etiologic agent of this disease; the cultivation of the spirocheta pallida by Noguchi; the complement fixation reaction of the blood after Wassermann; Noguchi's luetin cutaneous test; the determination of an increase of globulin after Nonne; also the lymphocytosis and Wassermann of the spinal fluid; Noguchi's recent observations on the presence of the spirocheta pallida in certain cerebral diseases, like general paresis, and, finally, the Ehrlich-Hata discovery of arsenic as a therapeutic remedy, have added new substance to the study and are all of the greatest aid to the clinical diagnosis as well as being means of control in the treatment of syphilis.

It is not supposed that we will be satisfied with even our present advanced understanding of this disorder, but with characteristic persistence our profession will prosecute the study of the many still hazy features of this disease. My presentation of this subject will necessarily be limited to certain features, and only in a manner of résumé will touch upon the various characters, leaving to the discussion an elaboration of the undeveloped features.

It is elementary knowledge that all the tissues of the ear may be affected by this disease—skin, periosteum, bone, cartilage, mucous membrane, nerves and vessels—and that the various stages of the disease may even attack the different parts of the ear. The disease may be present in the acquired or inherited form. As a matter of convenience, I will appor-

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tion my discussion of the subject to the external ear, middle ear, inner ear and intracranial region.

EXTERNAL EAR.

As a matter of fact, our observations of syphilitic lesions about the external ear vary considerably, owing, perhaps, in some cases to the class of material available, and again to a neglect in recognizing the probabilities of this disease in all of its protean types in this particular region. At my clinic at the Chicago Post-Graduate Hospital I have learned from the great number of cases seen there to recognize many that otherwise might have passed as of no particular importance or attributed to some other condition.

The chancre or ulcus durum is hard and infiltrated, usually single and umbilicated; the spirocheta pallida may be found on the slide, and the neighboring lymph glands are enlarged and sensitive. It is acquired from a bite, kiss, finger, tooth-pick, pen, pencil, towel, instrument, etc. It may occur upon any part of the external ear, but most commonly about the external meatus.

Lues of the drum occurs as a papule or minute gumma. These readily disappear under proper treatment, but otherwise usually soften and perforate into the middle ear cavity, creating a suppurative condition there. (Kirchner, Politzer, Gruber, Triquet.)

The secondaries are, as a rule, in the form of condylomas situated at the posterior auricular attachment, especially in young people; but occasionally, when found about the entrance of the meatus, they resemble granulations or polypi. The maculopapular eruption has been observed in the canal as well as on the drum.

The tertiaries form an interesting class of external ear lues. According to Gruber, Kirchner and Moss and Steinbrügge, there is a type that is due to a periostitis of the bony canal—not to be confused with a gumma—which by the pressure exerted causes considerable pain, even on movement of the lower jaw, as in eating. Some of the exostoses one sees causing narrowing or occlusion of the canal are the result of a former active luetic periostitis.

Occasionally gumma of the mastoid are seen. Bruehl[1] recently reported such a case. These gumma may disappear

under treatment, or they may disintegrate and create considerable destruction. When they soften in the canal they appear as an ulcer covered by a yellow grayish secretion.

MIDDLE EAR.

If one investigated thoroughly into the etiology of all middle ear cases presenting at a large clinic, the frequency with which lues appears would create no little astonishment. It is true, the association does not necessarily determine the cause in all such middle ear cases, but the frequency of association, the symptomatology as brought out from the past history, the old landmarks still present of former active processes, all tend to strengthen one's convictions of the commonness of lues as a cause of middle ear disease.

There is no description that will characterize a middle ear lues clinically. We are today, in this respect, not much changed from the position taken by Lowenberg forty-five years ago, when he said they, at that time, knew practically nothing about it. We, as they, still have to build up our evidence from a careful scrutiny of the parts in search of tiny gummas, periosteal thickening and ulcerations, and also from the history, neighboring lesions, laboratory tests, the presence of sequestrums with tell-tale odor, and finally by the response to treatment. But from the new knowledge learned from Schaudinn, Wassermann and Noguchi, a more accurate understanding of diagnosis in middle ear cases will surely result.

An endarteritis of the mucous membrane, and a periostitis of the bony walls, aside from gumma, constitute perhaps most of the pathology in this region. When the periosteal thickening following the periostitis involves the inner or labyrinth wall, ankylosis of the stapes may result. Habermann called this luetic sclerosis. A few years ago (1903) I published a paper on osteosclerosis of the mastoid,[2] which report is in accord with what Moss and Steinbrügge speak of as sclerosing mastoiditis the result of luetic periostitis. These were cases that presented an obscure otalgia, that proved later to be due to luetic periostitis, both of the middle ear walls and mastoid cells, and this without other evidences of ear trouble.

Lues of the tube in the primary form usually occurs at the faucial end, the result of dirty instrumentation, like a cathe-

ter. As secondaries it appears as an erythema or as pearl-like plaques (Deprès) at the faucial mouth. Tertiaries may also occur.

Perhaps some of the strictures of the tube that we frequently meet with are the result of healed ulcerations of luetic origin.

INNER EAR.

Inner ear affections are labyrinthine or retrolabyrinthine. In the acquired form of inner ear lues the disease usually appears at the end of the secondaries, although it has been noted as early as one week after recognition of the chancre, and again in some cases delayed for years.

The ear symptoms are like those of any other nerve deafness, with or without the vestibular symptoms.

The deafness is rapid in its progress and soon becomes quite profound. There is no preponderance of lost hearing in either the upper or lower end, but the entire scale, as a rule, is affected, with occasional islands of hearing for a little while. It has been my experience to find that only one ear may be involved, although it is but a matter of a short time before the other likewise exhibits similar changes.

The inherited form of inner ear lues may appear at any time of life, from infancy to middle age and past, but the far greater number are observed first between the eighth and sixteenth years. The combination of interstitial keratitis, pegged incisors and deafness at this age is familiarly known as the hereditary triad of lues. But this arrangement of symptoms is not invariable. I have quite often seen the teeth normal, while again I have seen the cases when their hearing was normal. Sometimes the deafness is from middle ear changes, with no labyrinth involvement. But the majority of my cases when first seen had marked nerve deafness, even unto deaf-mutism.

The deafness comes on quite suddenly; in fact, often over night or after some prolonged exposure or exertion. Occasionally it may appear rather suddenly and progress with only fair rapidity. It is usually bilateral and, according to Fraser,[3] frequently associated with ozena.

Where Ménière's symptom complex occurs, it has, according to Grey, this striking peculiarity: that when due to lues

there is but one such attack, while if due to other causes there is the likelihood of similar attacks.

The pathology, as presented to us by Politzer, Moss and Steinbrügge, consists of a round cell infiltration and hyperplasia of connective tissue substance, especially of the periosteum. There may be a serous labyrinthitis following a severe hyperemia, and even pus; new bone formation; chronic endarteritis, and hemorrhage into the fibers of the cochlear nerve, leading to atrophy, particularly in the basal coil and of the cells of the spinal ganglion. Gumma may be found in the petrous bone. Periosteal thickening causing pressure in the internal auditory canal may result in paralysis of both the seventh and eighth nerves. According to Rosenstein, a chronic basal meningitis about the entrance of the auditory meatus is much the commonest cause of these symptoms.

It is my belief, based upon the experience I have had with the use of salvarsan, that lues of the ear responds favorably to the action of this remedy, in both the acquired and inherited form, provided treatment is commenced within the first few weeks, better if in the first week, of its manifestation, and also if pushed energetically and supplemented by the use of mercury and K. I. The socalled neurorecedives, that have attracted so much attention lately, have but very seldom occurred in my cases, and in no case was there lasting involvement of the nerves. I am of the opinion of Haike and Wechselmann that the superior activity of salvarsan over mercury in penetrating the nerve structure and exciting the hibernating spirochetes to "move on" may account for these nerve symptoms, which would most likely occur later on if left to other forms of treatment, because all other forms of treatment seem not to reach these nerve stations. Perhaps in some cases where the nerve manifestation appears within a few days following the salvarsan, obliterating the canals and ankylosing the stapes, the condition is simply a Herxheimer phenomenon, but I cannot attribute it to any selected toxic action of the drug.

INTRACRANIAL AFFECTION.

The intracranial affection may be located most anywhere within the skull, but, according to the symptoms produced, it is convenient to speak of a lesion of the cortex, of the mid-

brain or nuclei, of the cerebellar pontine angle, and of the cerebellum. In the latter case disturbed equilibrium is present, similar to that of vestibular origin.

The pathology of lues in this territory is meningitis, endarteritis and gumma, named in their order of frequency.

As the fibers of the cochlear nerves cross at various places along the route from their nuclear origin near the fourth ventricle to the cortex of the temporal lobe, a lesion located in the auditory area of one temporal lobe seldom creates actual disturbance of hearing in either ear (excepting sensory aphasia, that may be present and mistaken for real deafness). Bilateral lesions have been known to cause complete deafness.[4] Deafness in both ears may also result from a lesion that encroaches upon the cochlear nerves where the fibers of each are situated close together, as in the ponsmedullary region. This is known as a midbrain or nuclear deafness, and is not to be confused with the cortical deafness just referred to. In the midbrain variety of the disease various symptoms, as a rule, are present that designate the seat of the lesion, such as ophthalmoplegia, dysarthria, ataxia, apoplectic attacks, bulbar paralysis, headaches. In fact, all kinds of neighborhood symptoms may be present, depending upon the extent and rapidity of the process, and particularly if acute in character. Large lesions and chronic cases are less likely to exhibit symptoms.

A lesion of the cerebellopontine angle gives rise to a one-sided deafness which appears early and usually has associated with it a facial palsy, vertigo, nystagmus, glossopharyngeal paralysis, etc.

In the diagnosis one may consider a rapid onset, profound deafness, or, at least, of severe degree, slight or absence of tinnitus (Siebenmann), associated protean manifestations of cerebrocerebellar characters, normal drum and open tubes, as strongly presumptive of intracranial lues. As additional evidence we have a facial palsy that may improve under treatment; also such other direct evidence of the disease as pegged teeth and scarred eyes, the blood and spinal fluid reaction to the Wassermann test, and the skin reaction to Noguchi's test.

In the differentiation one must particularly keep in mind the possibility of leukemia, pernicious anemia, diabetes, rheumatism, digestive disturbances, arteriosclerosis, aneurism of

the basilar artery, neoplasm, traumatism, toxic neuritis, occupational causes, hysteria and malingering.

The following case of intracranial lues presents several interesting features, chief of which were profound deafness with diabetic symptoms:

Male, forty-one years, otherwise healthy, digestion good; eyes, urine, temperature and blood pressure normal. Excessive user of tobacco. Gradual impairment of hearing, with mild tinnitus in left ear for two years. Sudden and profound loss of hearing in both ears on return from a long and tedious drive in the country. No vertigo, nausea, vomiting or tinnitus. On examination, he heard no voice at all, nor any tuning fork, either by air or bone. No spontaneous nystagmus, but both ears reacted normally both to the caloric and turning tests. Drums normal; tubes open. Wassermann strongly positive. Increasing doses of iodid of potassium and mercury up to 160 grains, and one-fifth of a grain respectively were taken daily for two weeks. Then six-tenths gram salvarsan intramuscularly. The latter was repeated four weeks later, with a continuation of the iodids and mercury. Between seven and nine weeks from commencement of the treatment symptoms of diabetes with other fourth ventricle disturbances began to appear, terminating in coma and death.

REFERENCES.

1. Bruehl: Laryngoscope, October, 1911.
2. Stein, Otto J.: Osteosclerosis of the Mastoid. Archives of Otology, Vol. XXXII, No. 3, 1903.
3. Fraser: Journal of Laryngology, Rhinology and Otology, August, 1909.
4. Pick and Mott: Archives of Neurology, Vol. III.

XV.

ESOPHAGOSCOPY.*

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The history of the development of endoscopy, both bronchial and esophageal, is of such comparatively recent date that laryngologists, even of tender years, cannot fail to be familiar with it. In no other branch of our specialty is the interest so keen as in this field. In no other branch is there greater possibility for investigation of diseased conditions. In spite of the labors of many in the past few years, we are still working in a practically unexplored field, and years must elapse before a proper interpretation may be placed upon some of the results that are being obtained and some of the conditions that are being determined. At present the question of the presence and removal of foreign bodies occupies the greater interest. Why this should be so may be readily perceived. The visible evidence of an accomplished effort is a source of satisfaction to anyone, and the psychic influence upon a patient or other interested parties at the sight of the cause of trouble is usually sufficient to evoke unstinted declarations of appreciation.

But there is another important phase of this work not to be overlooked. Ramming a rigid tube through the larynx or esophagus does not constitute endoscopy. The first thing one must learn, if he is to do this work with reasonable success, is that the utmost gentleness of manipulation must be employed. The use of force in attempting to pass a tube is never justifiable and is a technical error. Ill advised efforts may result in as great or greater harm to the patient than the foreign body would cause if left undisturbed. Those who have seen the result of blind and forcible attempts at removal

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can testify to this fact. While the disappointment is great in a failure, it may be largely mitigated by the knowledge that one has not left his patient in a worse condition than before the operation.

The indications for esophagoscopy may be broadly included under the heads of diagnosis and treatment. Under the latter we would place the removal of foreign bodies. In order to limit this paper I will confine myself chiefly to a discussion of the various conditions and phases that have presented themselves in my rather limited experience, more particularly in foreign body work.

Nearly all of the cases requiring operation for foreign bodies that have come under my observation have had the offending substance in practically the same location, commonly in the cervical portion of the esophagus, or, in other words, between the lower border of the cricoid cartilage and the level of the suprasternal notch. Why this should be so is not absolutely clear in my mind, but there is hardly any doubt that the explanation must be sought on physiologic and anatomic grounds. The cervical portion is the narrowest part of the esophagus, but I believe it allows of as much distensibility as the mouth. We are all aware of the sensation that a morsel of food, either too dry or too large, will produce in this region. A possible explanation for this may be seen if one studies the attachment of the inferior constrictor muscle to the cricoid cartilage.

Several years ago Dr. Wilson showed, before the Chicago Laryngological Society, a specimen in which there was a small triangular area beneath the inferior constrictor in which the muscle fibers were entirely absent. This would have the effect of weakening this part of the esophagus, and in the case of too large or unusual substances the power transmitted by the voluntary act of deglutition to the inferior constrictor would not, by reason of this weakness, be sufficient to force the substance downward. Not having received sufficient impetus in its downward course, the esophageal peristalsis, which constitutes the second or involuntary stage of swallowing, would not be strong enough to carry the offending material farther. As other contributing factors, may be mentioned the size and nature of the foreign body. The size may be so large as to render it mechanically impossible for any down-

ward extension by reason of a change in the axis of the body. Sharp pointed substances may penetrate the mucosa or muscular coat and thus be held in a fixed position. The administration of emetics may serve to bring about this condition. Substances with roughened edges may set up an irritation that rapidly leads to an edematous swelling of the surrounding tissues. The pain itself caused by a foreign body may cause the patient instinctively to keep from swallowing, thus favoring fixation by swelling, inflammatory or edematous.

The question of the removal of these foreign bodies situated in the upper part is not as simple at times as one would be led to suppose. Their apparent accessibility, as far as distance is concerned, may not possess any advantage unless one is familiar with just what may occur in this situation. All who are doing this work, at some time or other, have had the experience of the ease with which a foreign body may be overlooked when lying in the upper part of the esophagus. This may be due to several causes. Chief of these are an improper position of the head and the introduction of the tube without making use of the light until the tube is well engaged in the esophagus. If the latter course is pursued the foreign body may be loosened from its fixed position and enough force given it by the end of the tube as to enable the esophageal peristalsis to carry it into the stomach. However, the chief reason for failure seems to me to be the following:

In introducing the tube the end naturally impinges on the posterior pharyngeal wall. In passing the cricoid cartilage this position is maintained and the rigidity of the cricoid tends to keep the end of the tube pressed against the posterior wall. It is in this position that the tube may pass behind the foreign body, crowding it forward to the softer tracheoesophageal wall, and thus, even if the tube is introduced under the guidance of the eye, it may escape the view of the operator. In this situation the ledge or the under part of the cricoid cartilage may aid in hiding the body. When much of an inflammatory swelling or edema is present, surrounding the foreign body, it may escape observation, even when the tube is brought upward and careful search is made. As this may occur with comparatively large bodies, as, for example, coins, it is needless to speak of the difficulties that smaller substances or particles may present.

The diagnosis of the presence or absence of foreign bodies is not at all times a simple matter. The history as given by the patient, or, in the case of a child, by its parents, although of the greatest importance, may frequently be misleading as to the location in the esophagus or respiratory tract. Invariably the statement is made that the patient swallowed whatever the substance may be. No differentiation is made between inhalation or aspiration and the act of swallowing. Cough, dyspnea, cyanosis, pain, usually early, are the chief diagnostic points, if the foreign body is in the respiratory tract. To these, of course, must be added the physical findings, such as dullness, diminished respiratory murmur, rales, etc., if it is situated in a bronchus. Pain and difficult deglution are most important evidences if the esophagus is involved. The pain may be referred to the side of the neck or even to the posterior cervical region. Interference with deglutition in the case of children as a rule only extends as far as solids or some of the semisolid substances are concerned. We are usually able to get a history that the child can swallow milk or other fluids. In some instances where the foreign body has remained in the esophagus for a little time, and there is swelling present, the secretion from the mouth and pharynx will gather in the pyriform fossa and in the postarytenoid space, and by running over into the larynx will cause cough. At times characteristic in children is the form of the cheeks and lips of the child. These are distended to a moderate degree and is always an evidence of the accumulation of saliva in the mouth, owing to the child's unwillingness to swallow, due to the difficulty or pain. The pressure of an unusually large foreign body against the anterior wall of the esophagus will also produce dyspnea and may be the cause of confusion in determining the exact location of the foreign body.

Increased pulse rate and temperature may be present if a foreign body is present in either the esophagus or respiratory tract, and depends upon the length of stay of the foreign body and the changes in the tissues produced by it.

The skiagraph is of the greatest importance in the location of the foreign body, especially if the latter be of metal or glass. Certain substances, such as a vegetable ivory button, will not give a shadow. In other substances with slight density the shadow of the vertebra is very apt to hide the slighter

one. An important fact to be remembered is that a picture, in order to be of the greatest value, should be taken within a reasonably short time previous to operation, for, as has happened, one may have the experience of searching for a foreign body that has already passed into the stomach. In spite of negative X-ray findings, when any reasonable doubt exists as to the presence of a foreign body, an examination is justifiable. At times, as will be shown later, it will be necessary to have a number of pictures taken. Stereoscopic skiagraphs are of greater value than the single picture, as the latter may at times mislead one as to the location of the foreign bodies. I have seen plates of the same case made by different radiologists, in one of which the foreign body was shown apparently as low as the bifurcation, owing to the angle at which the picture was taken, but at the operation it was found to occupy a higher position.

The question of anesthesia is an imporant one. If any anesthetic is to be given, my personal opinion is that ether is to be preferred, in spite of its disadvantages. Among the leaders in this work the tendency of the day is to avoid the use of any anesthetic, either general or local. While I have removed foreign bodies in a few cases without the use of an anesthetic, my preference and custom is to have administered just enough ether to cause the preliminary relaxation and immediately proceed with the operation. The patient is allowed to recover consciousness while the operation is in progress, care being taken to prevent the child from struggling. As one acquires experience, with a corresponding improvement in technic, anesthesia may become less and less necessary. This perhaps applies more forcibly to bronchoscopy, as one must hesitate to add the dangers of anesthetic complications to the serious conditions already present.

In regard to instrumentation, it depends largely in which school one is trained. Whether one uses the proximal or distal light is a matter of the personal equation. The source from which the light is maintained is of greater importance, as the use of the street current may prove unpleasant to the operator and dangerous to the patient. One of the most valuable instruments in the armamentarium is the direct or open tubular speculum. The proper use of this instrument in many instances will obviate the necessity of the use of the

endoscope in the removal of foreign bodies from the upper part of the esophagus.

In two former articles the writer presented the history of a number of cases pertaining to foreign bodies in the esophagus.[1] A brief summary of these cases is as follows:

Case 1.—A boy, ten months old, with some difficulty in swallowing, irregular temperature, up to 101° F. The skiagraph apparently was negative, but owing to the nature of the foreign body a wrong interpretation was made. Examination revealed a broken toy ring hooked over the left arytenoid cartilage, projecting downward toward the mouth of the esophagus. This was easily removed.

Remarks.—This case illustrates the value of examination in cases where a reasonable doubt exists as to the presence or absence of a foreign body.

Case 2.—A boy, two years of age, with a coin in the esophagus for three days. A number of attempts had been made at removal without result. On admission to the hospital the child was septic, with a rather high temperature, and was quite ill. I failed in two attempts of short duration to find the coin on account of the swelling surrounding it. The coin was finally removed by Dr. Ingals. The child gradually failed and died in about three days.

Remarks.—This is the only fatality that I have to record from a foreign body in the esophagus in my own series of cases. I have always felt that the possibilities of success would have been greater had there not been so much traumatism resulting from the previous blind efforts at removal.

Case 3.—A girl, five years old, had swallowed a marble five days previous to entering the hospital. On account of the difficulty in securing a proper hold with the forceps considerable trouble was experienced. It was finally grasped with sufficient firmness so that its removal could be brought about. The marble was about 11 mm. in diameter.

Remarks.—It is hard to understand why such a comparatively small smooth body could have remained in the esophagus such a length of time. When finally secured it was at the lower part of the esophagus, just above the diaphragmatic constriction.

Case 4.—A girl, one year of age, with a penny in the esophagus. In this case I failed to find the coin with the esophago-

scope, but on using the open tube speculum no difficulty was found in removing it.

Case 5.—A child, seventeen months old, with a penny in the esophagus for four days. Increasing difficulty in swallowing. Removal without anesthesia with the open tube speculum and forceps.

Case 6.—A girl, five years old, with a tin whistle in the upper part of the esophagus for four days. Patient had considerable difficulty in swallowing and refused to make the effort. On the fourth day, however, she took a cup full of water and ate some plums. Pain was referred chiefly to the lower part of the posterior cervical region and the sides of the larynx.

Operation.—Examination was made without anesthesia and the whistle found. It offered so much resistance to removal that I judged it best to administer ether. The whistle was then removed and was found to be 2.2 cm. in diameter. It was located about the level of the suprasternal notch.

Remarks.—The fact that on the fourth day, when one could logically expect an increase in the difficulty in swallowing, the child was able to drink water and eat plums, illustrates how misleading the symptomatology may be at times. In this case we had a positive skiagraph, so that there was no doubt. In the absence of a picture, one would perhaps be tempted to delay on account of the abatement of symptoms.

Case 7.—A man, thirty years of age, while eating soup the night before, felt a choking sensation as if a bone had lodged in the throat. Examination was tried under local anesthesia, but on account of the great pain, it was extremely unsatisfactory. There was great swelling and edema of the lower part of the right side of the pharynx, epiglottis and aryepiglottic fold. This also extended into the mouth of the esophagus. The pain was referred along the side of the neck, and the patient was unable to take either fluids or solids. Under ether the next day, esophagoscopy was performed without revealing the bone. Subsequently under treatment the swelling in the lower part of the pharynx subsided, and the foreign body was found imbedded in the right pyriform fossa and removed. Its measurements were 2.5 cm. by 1.5 cm. The skiagraph was indefinite and unsatisfactory.

Remarks.—An attempt at removal covering two and one-

half hours' duration had been made previous to admission to the hospital. This in a measure was no doubt responsible for the extensive edema present and which served to make the examination difficult. A more careful search would perhaps have led to the discovery of the bone and rendered esophagoscopy unnecessary. The case, however, was not without value, as it demonstrated the necessity for a careful search of the pyriform fossæ in suspected cases of foreign bodies in the upper part of the esophagus. The seat of pain may at times prove deceptive, if one depends entirely upon it, in the localization of the foreign body.

Case 8.—A child, fourteen months old, had swallowed a small metal toy. Under ether I succeeded in finding the foreign body, but the resistance to removal was so great that I removed the tube and inserted a larger one with the hope that I might succeed in dislodging it with the end of the tube. I succeeded beyond my most sanguine expectations, so much so that I was unable to find the foreign body again. The father would not leave the child in the hospital, and even in the beginning would not allow us sufficient time for a radiograph or preparation of the patient. This case was a source of regret to me for several years, until I finally learned that the toy was passed by rectum a day or so later, and that the child made a good recovery.

Remarks.—A lesson learned in this case was that when one is consulted and assumes the responsibility in these cases, he should insist on the perfect cooperation of the parents. Neither is it wise to undertake any examination unless preparations have been made for any possible contingency that may arise.

For their statistical value, the following additional cases are reported:

Case 9.—Female, age seventeen years, while eating veal the day before, felt as if a piece of bone had lodged in her throat. She is able to take fluids but no solids. She complains of rather severe pain which is referred mostly to the sides of the larynx.

Operation.—Ether anesthesia. Open tube speculum. A sharp rough round piece of bone, 2 cm. in diameter, was found below the cricoid cartilage and removed. Patient was discharged the next day in good condition.

Case 10.—Child, nineteen months of age, swallowed a button six days previously. Since then she has been unable to swallow anything but fluids. The skiagraph was negative.

Operation.—Small amount of ether. Open tube speculum. The button was located in the upper part of the esophagus and removed without difficulty. It was of vegetable ivory, which probably accounted for the negative skiagraph. The parents were allowed to take the child home the same afternoon.

Case 11.—A girl baby, age thirteen months, six days before, had swallowed a penny which seemed to lodge in her throat. Following this she had a choking spell, accompanied by gagging and retching. Only fluids could be swallowed. As evidence of the pain and discomfort present, the baby held her hands over her chest and mouth most of the time. Temperature was 100.8° F.

Operation.—Just enough ether was administered to obtain relaxation. The open tube speculum was introduced, but some difficulty was found in locating the penny on account of an improper position of the head. As soon as this was corrected, the edge of the penny was easily seen and was removed immediately with no further difficulty. Temperature was normal on the following morning and the child was taken home.

Case 12.—A boy, age eighteen months, the morning of the day before admission to the hospital was given a part of the movement of a watch or small clock to play with. He placed it in his mouth, together with a cracker he was eating, and attempted to swallow the mass. This was followed by a choking spell. He was given some milk to drink, and a member of the family thrust a finger into the baby's throat, either to produce vomiting or to remove the wheel, without bringing about either result. The child became very listless and wanted to rest. A fluoroscopic examination showed the foreign body in the upper part of the esophagus. Temperature before operation was 100° F.

Operation.—Minimum amount of ether. By means of the open speculum the foreign body was located below the cricoid cartilage in the upper part of the esophagus. The wheel was seen to be notched and was on an axle projecting from either side. On account of the projection of these ends of

the axle considerable care was necessary in bringing about its removal so as to avoid lacerating the esophagus. On removal, the diameter of the wheel was found to be five-eighths of an inch and the length of the axle three-eighths of an inch. Recovery was uneventful, the child being permitted to go home the following day.

Case 13.—Girl, eight and one-half months old, had swallowed an open safety pin fours day before. The accident was followed by a coughing spell. Since then the child had shown very little discomfort. The temperature was normal. The skiagraph showed an open safety pin above the sternal notch with the point projecting upward.

Operation.—Ether anesthesia. After several attempts to close the pin with various pin closers, it was finally grasped and closed with an Arrowsmith forceps and withdrawn. The open tube speculum was used. No traumatism to the esophagus. Recovery uneventful.

Case 14.—Boy, age three years, was playing with some nickels and pennies when he suddenly had a choking spell. His mother looked into his mouth and seeing the coins was able to remove one. The others she pushed down into his throat. The accident happened three days before admission to the hospital. Other than some difficulty in swallowing the child has felt well. The skiagraph showed what appeared to be a single coin above the suprasternal notch.

Operation.—Ether. Open tube speculum. A nickel and two pennies were removed. It was found that they were stuck together, which accounted for the fact that they were all removed at the same time.

Case 15.—Girl, two years old, had swallowed an ordinary telephone slug seven days before. Since then she has had considerable difficulty in swallowing and some trouble in breathing. The skiagraph showed the slug in the usual location.

Operation.—Ether. The slug was quickly found and removed without difficulty. Uneventful recovery.

Case 16.—Child, age two years, was sent into the hospital from the dispensary. The history given was that a nickel had been swallowed a number of days before. Although there was some difficulty in swallowing, the child did not seem to be suffering.

Operation.—Ether. Open tube speculum. The nickel was found in the upper part of the esophagus and removed.

Case 17.—A boy, twenty months old, had a quarter in his esophagus for several days. Some difficulty in swallowing was present. The skiagraph showed the coin at the level of the suprasternal notch. The temperature was 100 3/5° F. on admission.

Operation.—Ether. Open tube speculum. No trouble was encountered in finding and removing the quarter.

Case 18.—A girl, three years old, had swallowed a brass button two days before admission to the hospital. Following the accident the child vomited her breakfast. She was peevish and cried a great deal. Liquids could be taken. The cheeks and lips were distended on account of the excess of saliva accumulating in the mouth on account of the child's unwillingness to swallow. The temperature was 99 3/5° F. The skiagraph showed the button in the upper part of the esophagus.

Operation.—Ether. Open tube speculum. The button was found and removed without any special difficulty. It measured 2.2 cm. in diameter.

Case 19.—A girl, sixteen months old, two days previously had swallowed a button. It was stated that since that time she had only been able to take fluids.

Operation.—No anesthetic was administered. Examination of the upper part of the esophagus was made with the open speculum and revealed a dirty grayish mass, which was removed. It consisted of small pieces of meat. After this was removed the button was seen, but on attempting to grasp it with forceps, it became dislodged and slipped down the esophagus. I passed the esophagoscope without finding it again. Feeling sure that it had passed into the stomach, the parents were allowed to take the child home with instructions to watch the stools. The button was passed forty-eight hours afterwards.

Case 20.—This was another unsatisfactory case from the standpoint of the collector of specimens of foreign bodies, but was gratifying to the patient. A man, thirty-five years of age, complained of intense pain in the lower part of the esophagus which he thought came from a piece of bone that he had swallowed. Every attempt to swallow was accompanied by such an acute pain that the patient refrained as much as possible from making the effort. He had temperature around 100° F.

and was unable to rest at night. Esophagoscopy under local anesthesia revealed a small piece of bone which had become lodged at the diaphragmatic constriction. There was considerable congestion about the opening. The bone was seized, but on bringing it up it slipped away from the forceps and passed on down the esophagus into the stomach. After its dislodgement the relief from pain was almost immediate and the patient was able to swallow without difficulty.

Remarks.—The disappointment to the operator is usually great if one finds the foreign body and then fails to secure it. The end result as far as the patient was concerned was the same in the case I have cited as if the foreign body had been removed through the tube. Consequently, these cases cannot be said to be failures.

The statement was made above that it is well to have a skiagraph made within a reasonably short time previous to the examination. The following case will illustrate this point.

Case 21.—A boy, two and one-half years of age, had swallowed a tin whistle. He was brought to the hospital on the following day. At this time he complained of pain which he located in the region of the thyroid cartilage. The skiagraph showed the whistle in the upper part of the esophagus. I saw the child the next day, about twenty-four hours after the skiagraph was taken. Under ether the examination was made with the open tube speculum, but the whistle was not found. The esophagoscope was then passed with a similar result. Inasmuch as the speculum had never failed to show a foreign body of this size in this location, I believe my conclusion that it had already passed into the stomach before examination was justified. A picture taken shortly afterward showed the whistle in the stomach.

Another statement made was that at times it will be necessary to have a number of pictures made. An exemplification of this is seen in the next case.

Case 22.—A girl, thirteen years of age, stated that while holding seven or eight pins in her mouth she became frightened and swallowed them. This had occurred two days before. She complained of pain in the right lower side of the abdomen and of painful and difficult deglutition. The skiagraph showed a number of pins in the lower part of the phar-

ynx and one apparently about the mouth of the esophagus. There was also the shadow of a pin in the right iliac fossa.

Examination.—One pin was found between the base of the epiglottis and the root of the tongue. Esophagoscopy under ether failed to reveal any more. A picture taken that evening still showed pins present. Examination of the pharynx and another esophagoscopy were without result. Another picture was taken which was negative. However, the patient still complained of pain in swallowing, and after a thorough examination two pins were found below the lower pole of the left tonsil. In view of the preceding negative skiagraph we began to suspect that we had to deal with a case in which the pins had entered on different occasions. A general examination showed the absence of the conjunctival reflex and an insensitive pharynx. The larynx was normal. The mother was interrogated and stated that the girl had the habit of placing extraneous substances, such as buttons, in her mouth. The patient strenuously denied placing the pins in her mouth intentionally. Confirmation of our suspicions was brought about by the next picture and examination. This showed a pin in exactly the same location between the base of the epiglottis and tongue as the first one removed. In this situation it would have been impossible to have been overlooked in any kind of an examination. After this pin was removed the patient by her attitude practically admitted that our suspicions were true. The pain disappeared from her throat and after being kept under observation for several days she was allowed to return home.

To enter into a discussion of esophagitis produced by the passage of a foreign body would prolong this paper to too great a length. It is a recognized fact that the symptoms may persist for a considerable time after the offending substance has passed into the stomach. One other result of injury to the esophagus in connection with a foreign body needs to be mentioned, that of periesophageal abscess. I have seen only one case, of which the history is as follows:

Case 23.—A man, about fifty years of age, swallowed a piece of bone which he thinks lodged in his throat. This occurred five days before. He consulted a physician, who stated that he could find no bone and advised a gargle. Later an attempt was made to extract the bone with a horsehair bougie. Since

the accident the pain has gradually increased. It is almost impossible for him to swallow fluids. His temperature on admission was 101° F., pulse 120. He had a lesion at both the aortic and mitral valves, and the urine showed both nucleo- and serum albumin.

Examination.—The mouth of the esophagus was seen to be greatly swollen. On attempting to pass the tube some pus was seen. On working the end of the tube over the point from which the pus appeared, between one and two drams of a very foul smelling pus was forced out. There was some relief to the patient, and it was decided that further examination should be postponed, as it was impossible to pass any sized tube through the swollen area. Following this examination, there was considerable discharge of pus and the temperature dropped to 99° F. On the second and third day it rose to 100° F., but on the fourth day it dropped to normal, where it remained. About the seventh day the symptoms had practically subsided and esophagoscopy was performed. A tube was passed without difficulty and showed a small mass of granulation tissue on the right side of the esophagus, about 2 cm. below the cricoid cartilage. No foreign body was found. Recovery of the patient was complete and was a fortunate outcome of what promised to be a serious condition. Whether the infection arose primarily from the irritation caused by the foreign body or from the passage of the bristle bougie, it is impossible to say. The continuous application of cold compresses to the neck and the taking of iced drinks were undoubtedly an aid in preventing an extension of the infection, although naturally the chief factor in securing the cure was the evacuation of the pus.

SUMMARY.

Of the twenty-three cases presented, foreign bodies were removed from the esophagus in sixteen, one of which was but partially successful. In two others, the foreign body was secured, but was lost and passed into the stomach. In three cases the symptoms were those of esophageal involvement, while the cause of trouble was located in the lower part of the pharynx and removed. In the remaining two cases, no foreign body was present, in one of which a periesopha-

geal abscess was found. One fatality is noted. In thirteen of the sixteen cases, the age of the patient was under three years, the youngest being eight and one-half months old

REFERENCES.

1. Friedberg, S. A.: Bronchoscopy and Esophagoscopy. Illinois Medical Journal, March, 1911. Some Esophageal Cases. Illinois Medical Journal, January, 1912.

XVI.

THE EPIPHARYNX IN CHILDREN.*

By Edgar M. Holmes, M. D.,

Boston.

We can almost make the statement that the only importance of the epipharynx in children, as well as in adults, is due to its association through the eustachian tube with the ear, for with few exceptions we are called upon to treat this area for some resulting or threatened pathology. As over ninety per cent of all pathologic conditions met with in otology are due directly or indirectly to some existing or preexisting pathology within the epipharynx and eustachian tubes, the study of this area becomes the foundation upon which rests our profession as otologists. Anything we can avoid doing which may be liable to result in conditions favoring otologic disease should be followed with as keen interest and care as the more spectacular and brilliant procedures to combat the later advancing disease in the middle ear, mastoid cells, labyrinth, and cranium. The majority of us will agree concerning this subject; and yet there is not one of us to whom it is not more fascinating to perform the major surgery than it is to carry out the sometimes protracted and tedious work of discovering and removing the frequently seemingly less important etiologic conditions within the epipharynx. The idea which we must strive to attain is to be able to not only diagnose all the pathologic conditions within the epipharynx, but to be able to so combat and eradicate them as to prevent their extension into and their effect upon the aural structures. This ideal opens up a field which will doubtless give us no rest or lack of interesting research for many years to come. I believe that by improved methods and with more definite knowledge we shall be able to preserve more and more ears, and thus prevent a great

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loss of proficiency, not only to the individual, but to society in general.

Since 1885, when Emil Mayer presented the result of his studies upon the epipharyngeal hyperplasia of Waldeyer's ring of glandular tissue, volumes have been written concerning this subject. Men of marked ability and special experience, as well as those who have seen comparatively few cases, have written upon the subject of adenoids in children; and yet even today, when we ask ourselves or discuss the subject with others, we find that there is so much concerning etiology, treatment, and prognosis that is in doubt, that we cannot make a positive statement which can be applied in general to this common condition. Our knowledge concerning the acute and chronic inflammations of the epipharynx, whether due to local infection or existing as sequelæ of various pathologic conditions of other organs, is so far from positive that we must still continue to study and strive if possible to establish sufficient facts to enable us to not only make a correct diagnosis of epipharyngeal disease, but in a large percentage of cases to be able to ascertain the etiologic factors producing these pathologic changes, and shall also know when and how to proceed with the treatment, operative or other, for the best future as well as the immediate results in the individual case. Some will think it strange that I should raise the question in regard to epipharyngeal adenoid hypertrophy, for they will say: "If there is adenoid hypertrophy, just remove the growth and that will be the end of the trouble." I wish it were so, for the whole subject would be reduced to a simple one of fact, and our students could be told that whenever there is a swelling of the glandular tissue, whether acute hyperplasia or chronic hypertrophy in the epipharynx, just curette it out and all will be well. We all know that there are many children who are afflicted with middle ear disease who have adenoid hypertrophy, and who are entirely relieved when this adenoid obstruction is removed; and we also know that there are many other cases which are helped for a short time and then become as bad as before. Some of these have recurrence of adenoid hyperplasia, but many do not. Some cases are not helped in the least by an adenoid operation, and may even be worse than before. Quite frequently we find in children, as well as in adults, a marked tendency to epipharyngeal and tubal disturb-

ances, with the resulting aural complications, when we find anatomically an apparently normal nose and epipharynx. Again, there are many cases where some deformity is found in the nose or postnasal space, and when these are corrected there is no apparent improvement. We have only to review the special literature to see how prone we all are to become narrow in our observations and to consider our subject as an isolated field, free from external influences. Although it is at present not possible, with all our aids in investigation, to always feel at all sure of our ground, it is our duty, so far as it is within our power, to consider abnormal conditions within the epipharynx from various viewpoints before deciding upon a course of procedure.

Before taking up my special study of the epipharynx, I questioned why there should be such a difference in the results following apparently the same operation for apparently the same pathologic conditions; but I had not reckoned sufficiently with the various resulting influences of the same amount of excessive tissue, due to the difference in size and shape of the epipharynx and the varying position and patency of the eustachian tube, nor had I given sufficient consideration to the resulting cicatricial tissue which follows the usual operative interference for the removal of the epipharyngeal adenoid mass. The adhesions found in the lateral fossæ, the semiatrophic areas sometimes found in the vault of the epipharynx, with the resulting interference with the pharyngeal end of the eustachian tube in patients operated upon by our most skilled surgeons, trained in our special work, make us stop and question. While we are studying this subject we can easily become pessimistic and be led so far toward the side of nonsurgical interference as not to be conservative. It is not the purpose of this paper to court pessimism, but to present some facts while discussing this subject which will show that we are but beginning to learn the rudiments of the subject which has been so studied, hashed and rehashed for nearly thirty years.

Were it not for cicatrices and their effect upon the eustachian tube, the subject of adenoids would be of little importance, for with our present knowledge the immediate resulting effects of the adenoid operations are very rarely bad, and frequently the individual is improved in many respects. The

results are so excellent in many severe cases that the physician of moderate training and ability, as well as the guardian of the child, is frequently led to think of an adenoid operation for all the ills of childhood, from indigestion to enuresis. During the past few years it has been the pastime of the mediocre family physician to advise and try to perform an adenoid operation upon every child who shows any symptoms of ill health. In many cases little is accomplished or little trauma produced, but often the walls of the lateral fossa are injured; and we have seen the mucous membrane and also the cellular tissue removed to such an extent as to bare the bone in the epipharyngeal vault.

The unskilled work in the epipharynx does not concern us so much here, but the work performed by our school physician and nurses, complemented by the hospital outpatient clinic, does. The school children in our cities are referred by the young school physician and conducted in droves by the school nurses to the various clinics, and we, as a rule, are prone to give them a quick glance, and then pass them on to the young interne or assistant surgeon for operation. I believe that in this manner we are committing one of the greatest medical crimes of this generation, for a large percentage of the children not only do not need an operation in the epipharynx, but would be far better off without such a procedure. Under the usual methods of examination it is easier for the overworked men in the clinic to pass on to the operating room these cases than to carefully examine them and disagree with the school physician; but I believe we should select all doubtful cases and have two or three men in the clinic pass upon them, and then, if thought best, refer them back to the school physician, stating that at time of examination we did not deem operation advisable, but would like to again examine the patient if symptoms should ever arise suggesting nasopharyngeal disturbances. There can probably be no cause for discussion concerning the advisability of removing a large central adenoid mass which hinders respiration or presses upon the cushion, or overlies the pharyngeal orifice of the tube, but in these cases great care should be used to avoid injuring the cushion of the tube while removing the adenoid tissue, and our whole duty has not ended with the operation, however skillfully performed. These patients should be examined

within a few weeks after the operation, to learn if there has been healing without adhesion or other deformity. If we can impress the advisability of this examination upon the guardian of the patient, as well as upon the medical profession in general, we shall have done much to protect our patients against evil or unsatisfactory results which sometimes follow the operation for the removal of adenoid hypertrophy.

One of the reasons for presenting this subject is to ask: Have our methods of examination in the past been such as to enable us to so carefully diagnose the conditions in the epipharynx as to tell what cases need surgical interference and what cases will best be cared for by other means? In marked cases we can say, yes; but in a large number of cases we must say, no. With the nasopharyngoscope it is possible, in the majority of children over four years of age, to inspect the epipharynx while at rest and during the act of deglutition. This has been of great assistance and satisfaction to me in all the cases where the nasal passage was sufficiently large and the child was under control, but in younger children, and in those who are timid and cannot be controlled, it is frequently difficult, and sometimes impossible, to pass the pharyngoscope through the nose. The epipharyngeal space is small and the digital examination is frequently misleading, even with a long, slim finger. In these cases it is usually impossible to satisfactorily examine with a postnasal mirror, for the child in resisting and crying closes the pharynx from the epipharynx. I have been very anxious to examine these little patients as I could older ones, for the knowledge gained by vision is usually much more definite than that of speculation or even that of palpation. Last spring I devised a tubular speculum which can be slipped behind the soft palate, and by sliding the retractor it will carry the soft parts so far forward as to expose the whole epipharynx. The nasopharyngoscope, passed into the speculum, lights and gives a view of the entire epipharynx. This method is not as good as the one of passing the endoscope through the nose, for there must be some distortion produced by any instrument which draws upon the palate. It is not possible to observe the effects of deglutition, but it is an advance and a great aid in the examination of those cases which cannot be examined through the nose. It shows perfectly the amount and location of the adenoid, its

relation to the tube, the general condition of the pharyngeal end of the tube, and the condition of the posterior ends of the turbinates. It can be used by any one of ordinary ability, and little more time is necessary than for the use of a tongue depressor in the inspection of the pharynx. With the patient's head held firmly by a nurse or assistant, and with a gag between the teeth, it is possible to use this instrument even in a resisting child.

In a great many cases where there is a low type of middle ear disease, and where there is some obstruction to normal breathing, and where without special study of the case we would be tempted to advise immediate adenoid opration, we are able to so change the habits and hygiene of the child as to get relief of the existing interference and to prevent the liability of its recurrence. It is surprising how quickly epipharyngeal disturbances will arise as soon as the patient is subjected to the overheated and excessively dry air of our modern heated and often poorly ventilated rooms; and it is equally surprising how quickly such a patient will improve as soon as more moisture is added to the living, and especially to the sleeping, room. We have all seen children with epipharyngeal hypertrophy, with the associated and resulting symptoms, after having lived in unhygienic surroundings during the winter, go in the springtime out into the open country and sleep in the normally moist air, and begin to immediately improve in their symptoms. An examination of these cases in the autumn frequently finds no pathologic condition. We realize that there are many children coming to our clinics from very poor surroundings for whom little can be done to change the unhygienic mode of living; yet in these cases we may be able to accomplish something through the aid of the social service workers. Efforts in this direction are often more important for these unfortunate little patients than the simple operative measures performed more or less as a matter of routine. In all of these cases where there is any doubt as to the advisability of operating for adenoid or other nasopharyngeal conditions, the time which would be necessary to carry out the operative procedure will in most cases be sufficient to place them in the proper departments for special investigation, and many can be given relief for the existing conditions.

Many cases of epipharyngeal inflammation and hypertrophy are due to separate foci within the nose, and are relieved by treatment of the existing nasal disease. Deformities within the nose are frequent etiologic factors in producing epipharyngeal inflammations and hypertrophies, and their correction often results in the relief of these conditions. Too often we see, especially in children, operative procedures within the epipharynx when the fundamental cause of all existing trouble is within the nose. A good view of the posterior nares will often give a clue to the etiologic role played by the nose. If there is a marked hypertrophy of the posterior ends of the turbinates, or if there is a purulent secretion flowing over them, we can often find the source of the trouble within the nose. Until these causes are relieved we cannot expect any permanent relief of the resulting pathology within the epipharynx.

Having considered the general associations of epipharyngeal disease in children, now we come to the subject of therapeutics, which naturally divides into that of general and local. Although the general therapeusis is frequently fully as important as that of the local, it has to deal with the treatment of so many systemic conditions which may act as etiologic factors in epipharyngeal disturbances, that it is too extensive to be discussed here except in a very general way. Gastrointestinal disturbances must receive attention. The epipharynx in children, as well as in adults, is almost always affected by attacks of indigestion and constipation; and diet, together with measures to regulate and so far as possible correct these defects, is of great importance. Malnutrition and anemia are not always the result of epipharyngeal inflammation and swelling, but are often etiologic factors in these conditions. This fact should be kept in mind, as we should not subject these patients to local treatment until we have carefully studied their general condition and have eliminated as far as possible all contributing causes.

Children who are subject to acute epipharyngeal inflammations should be warmly but not excessively clothed. They should be given all the fresh air possible, but they do not withstand excessive draughts of air, especially while sleeping. They should be given sufficient exercise, but more care is often necessary with them when they are at play than with the child

of greater resistance. They must be more careful after becoming heated not to sit in draughts or lie upon damp cold ground. It is often difficult to decide how much care to exercise in any case. We must not coddle them too much, nor should we make them too apprehensive of trouble every time they happen to be exposed to draughts or other unavoidable exposure. We must try to gradually harden them to exposure, but nothing is gained if we carry our hardening methods beyond a point followed by healthy reaction. In the anemic and frail child who is very prone to frequent and often severe attacks of epipharyngeal inflammation, as well as in those who suffer from a chronic condition, the syrup of iodid of iron is often of considerable service.

The infections of the epipharynx, being almost always associated with similar infectons of the nose, and frequently associated with like oropharyngeal infections, often demand simultaneous treatment with these adjacent cavities. In epipharyngeal infections, as aural complications are frequently of great importance, it is essential that early treatment be applied which may prevent severe aural extension. In the early stages of congestion of the nose and epipharynx the patient, if possible, should be placed in a room with plenty of warm moist air. A small dose of Dover's powders, with some hot drink, often aids by stimulating the skin to greater activity. A saline, or a dose of oil is advisable, especially when the child is inclined to be constipated. In young children we must generally advise against the use of douches, even when there is hypersecretion, as there may be more danger of injuring the eustachian tube and ear than of protecting them against the advance of the infection. Steam with the vapor from tincture of benzoin may be of service. A spray of benzoinal and resorcin is often efficacious. Heat applied to the sides of the neck near the maxillary angle is of marked service in allaying many of the acute epipharyngeal congestions. Often very satisfactory results can be obtained by applying to the nose anteriorly an ointment of hydrastin muriate, gr. 3; menthol and eucalyptol, each gr. 7; and lanolin oz. 1. Only a small amount of this ointment should be applied at one time, and three applications are sufficient for a day. A 10 to 20 per cent solution of argyrol applied to the epipharynx, either by the eustachian tube or by dropping through the nose, has been found to produce

very satisfactory results in a large number of these cases. Where these inflammations are accompanied by marked swelling and with extension into the tube and ear, and where there is complete blocking of the tube with the resulting middle ear inflammation, whether or not there is secretion within the middle ear and bulging of the membrana tympani, quick relief of the ear condition can usually be obtained by injecting a solution of cocain and adrenalin into the eustachian tube, and following this after a few minutes with an injection of argyrol. In young children, or in older children who rebel against treatment, we sometimes find it hard to use the eustachian syringe. In these cases the patient's head can be held in the Rose position and tilted toward the affected ear, and the solutions can be dropped through the nose and allowed to flow toward the orifices of the tube. It is much more satisfactory, where possible, to use the syringe under the guidance of vision. This is true in regard to all treatment of the epipharynx, especially when working about the orifice of the eustachian tube.

Chronic epipharyngeal inflammation may produce a simple hypertrophy, with or without purulent secretion, or may go on to atrophy of the mucous membrane and to the underlying structures. Except in the after-results of severe epipharyngeal diphtheria, it is very rare to find an atrophy of the mucous membrane in young children. The chronic inflammations are frequently associated with or due to septic nasal inflammations. In chronic epipharyngeal inflammation, even in young children, we must not forget syphilis as a possible etiologic factor. Chronic purulent epipharyngitis in young children is often very hard to treat. It is frequently the result of a chronic purulent condition somewhere within the nose which it is impossible to definitely locate.

In all our work within the epipharynx, whether for exploration or treatment, we must use great care, for the mucous membrane of this area, especially that covering the eustachian tube, will not withstand harsh treatment, and much injury may follow careless treatment. In cases where it is necessary to remove bands or growths in the lateral fossa, or to treat any pathologic conditions about the orifice of the eustachian tube, it is possible to proceed with greater precision when the operative field is under vision. This is ac-

complished when possible by passing an endoscope through the opposite side of the nose, and the operative instruments through the same side as the lesion to be attacked. Dr. Yankauer has demonstrated the direct method of attack through his direct speculum. In a recent paper, Dr. Beck has described a method of attack, operating upon the epipharynx under direct vision. He passes a rubber tube through both nostrils and then carries the ends through the mouth. By applying traction he lifts the soft palate forward. I have not had sufficient experience with this method to pass judgment upon it, but thus far I have been unable to view the cushion of the tube or the lateral fossa. In very young children it is frequently impossible to operate upon or treat the epipharynx under vision by the aid of the endoscope. The nasal passages are frequently too small, and it is impossible to keep the patient sufficiently still. I am of the opinion that this is also true with Dr. Yankauer's tube. I am trying in these cases to pass the curette and forceps by the side of the palate retractor, and then use them in the epipharynx under the guidance of the pharyngoscope passed through the tube of the retractor. As yet I have not developed a sufficiently positive technic to be able to proceed rapidly and accurately, but I hope and believe it will be possible to accomplish this in time. It is fortunate that in the very young, and in older children who have not been subjected to trauma, it is rare that we find adhesions in the fossa or a demand for surgical treatment for the existing nasal disease.

What we most need at present is more proficiency in examining the epipharynx, especially in children, and more conservatism in treating the pathologic conditions found in this space. In order to fulfill these demands it is imperative that we take a wide and comprehensive view of every case before deciding upon the best course to pursue, keeping always in mind that the important object is to prevent aural disease and to relieve as far as possible any existing pathologic conditions within the ear.

XVII.

PAROTID FISTULÆ FOLLOWING MASTOID OPERATIONS.*

By Dr. Corrado Canesteo.

DISCUSSION.

The parotid gland, although deriving its name from the close proximity to the ear, very seldom participates in aural lesions. Pigue and Tonbert have recently called attention to a group of parotides which has an aural origin; that is, this group is concomitant with, or subsequent to, primary infection of the external ear (furuncle of the auricular canal), or of the middle ear (suppurative otitis, mastoiditis). This condition is explainable not only by the simple relations of continuity, but also by the existence of important lymphatic communications. Among the extracranial complications which accompany or follow aural lesions, inflammatory conditions of the parotid are the rarest.

We wish to speak of another complication which is much rarer, that is, the appearance of a parotid fistula following operative procedure on the mastoid, as we had the opportunity of observing the following case:

T. G. B., age four years, native of Genova, with negative family history. Two years ago, at the end of March, he contracted measles, complicated by an acute otomastoiditis which on the 19th of May required operative intervention. The process of healing was regular; but at the lower end of the wound there remained a fistula discharging an aqueous fluid, more abundant during meals. The patient had never complained of any pain or presented any tumefaction in the parotid region.

On inspection of the retroauricular region there is seen an old linear scar, which shows at the inferior extremity a small opening from which issues a transparent, colorless fluid, some-

*From the Institute of Special Surgical Pathology of the Royal University of Genova (Director, Professor E. Bozzi).

what opalescent, slightly viscid and a trifle alkalin in reaction. This secretion increases under the influence of the movements of mastication, and becomes especially abundant during meals or when in any other way the salivary secretion is stimulated. About 1 cc. of the liquid can be easily collected, which shows the physical and chemical characteristics of saliva. Cytologic examination shows fine, granular epithelial cells with refractive nuclei, salivary corpuscles, and clusters of mucous cells. The fistulous opening admits a very fine filiform bougie which enters about 1 cm. Inspection of the oral cavity does not reveal anything of importance. Stenson's duct is unobstructed and the saliva drips freely from its opening.

In the beginning of the treatment we injected into the fistulous tract a few drops of tincture of iodin, and later we used galvanocauterization; but obtaining no results from these methods we introduced a small quantity of Beck's paste with a fine blunt needle. After two of these injections the fistulous tract was closed permanently. It is now months since the saliva has ceased to appear.

Now, in discussing the case, how can we explain the formation of the postoperative fistula?

It is known that the posterior surface of the parotid is in close contact with the mastoid process. A small part, lying upon it and its fibrous capsule, is very adherent, especially at the level of the tendinous insertion of the sternocleidomastoid muscle and of the inferior wall of the auricular canal. Yet the parotid, during operative procedure on the mastoid, from the topographic anatomic point of view, can be considered to lie outside of the surgical field.

Since in our case, the fistula manifested itself immediately after the operation without noticeable inflammatory conditions of the mastoid, we are forced to believe that it was due to an operative wound of the salivary gland. On the other hand, the linear scar, being in its classical position, excludes the possibility that the cause of the fistula was a defective incision. Therefore, we must admit that there was either an anomalous conformation of the parotid that permitted part of the same to cover a considerable part of the external surface of the mastoid, or, rather, that there was an abnormal location on the mastoid of a gland somewhat hyperplastic, on account of past acute or chronic inflammatory processes.

that took a latent course. In that case, the fistula would have followed a lesion of the parotid, due, not to the incision, but to the manipulations in detaching the periosteum, made more difficult by the new formation of very strong adhesions. Even under normal conditions, during this stage of the operation, especially if rough tactics are employed, we cannot entirely prevent lesions of this kind happening. Since these lesions are never reported, we must think that usually they must be so unimportant and followed by such a rapid process of reparation that they completely escape observation. In reviewing the literature I found only a single case of a fistula of the parotid following immediately upon the operative intervention. This case is reported by Kretschman, as follows:

"A male, twenty-five years of age, with a right mastoiditis. Resection of all the process, normal healing of the wound. But after cicatrization, a small circular opening remained at the level of the tip of the mastoid, from which a limpid fluid dripped, which increased in amount on mastication. The opening admitted a small bougie to the depth of 2 cm. toward the inferior wall of the canal. After a few unsuccessful attempts a cure of the fistula was obtained twenty-two weeks after the operation by repeated cauterizations with silver nitrate."

There are four other cases in which fistulæ appeared much later. These are:

Case 1 (Kretschman).—Girl, ten years of age, was operated on the right mastoid. Cicatrization in eighth week. Three months after operation, following a blow, a fistula appeared, without swelling, at the lower part of scar, from which dripped a colorless fluid which increased at meal times. The probe showed the direction of the fistula to be toward the inferior wall of the canal. Silver nitrate cauterization was repeated, with healing on tenth day.

Case 2 (Combier).—A. O., age ten years, with an intermittent otorrhea since age of three. For three months he had a swelling of the mastoid region, especially at the level of the tip of the apophysis. Incision and curettement. Cicatrization in one and one-half months. A month later, all pains were relieved and a small fistula appeared at the inferior part of the scar, from which issued continuously a watery fluid which increased during meals, with a feeble reaction to per-

chlorid of iron. A needle, mounted on a syringe (Pravaz), containing tincture of iodin, was injected into the orifice. Cure was obtained on a single injection, with a slight local reaction.

Case 3 (Combier).—L. R., age twenty years, operated on the 30th of May, 1907, for a right mastoiditis. Wide opening of the tip and exploration of the digastric fossa. Cure in three and one-half months. The following month he complained of pain on the right side of his head and a sensation of tension at the inferior part of the scar. A small opening then appeared, from which issued a clear fluid, and pain ceased. Fistula closed and reopened again, three weeks later, but again closed. After eight months, however, two years after the operation, the discharge became continuous. Patient entered hospital in June, 1909. Fluid which was obtained had the character of saliva. Permanent cure was effected by the injection of tincture of iodin.

Case 4 (Combier).—H. M., age thirty years, entered November, 1908, with an otomastoiditis—a chronic suppurative otitis media. The following day petromastoid region was opened. A purulent collection evacuated. Cicatrization completed in February, 1909. The patient complained, only from time to time, of pain on the left side of head, with a sensation of weight under the ear. During the month of May, 1909, while eating, there issued a fluid at the inferior part of scar, with salivary characteristics. A few drops of tincture of iodin were injected, and healing was obtained with slight local reaction.

Combier excludes the idea in his cases that it was due to a secondary infection of the parotid, or of a suppurative parotitis—for this is an exceptional complication (Duplay and Charasse)—as there were no symptoms of parotitis. He, instead, ascribes the formation of these fistulæ to operative wounds of the glands which healed while the bone was suppurating. Thus, the lobules of the gland, so denuded, would have undergone a slight process of sclerosis, partly due to contiguity with the mastoid wound, and partly due to a latent inflammation of its excretory duct, followed by temporary obstruction of the same. The newly formed pocket, which could not evacuate itself by its excretory duct, situated immediately under the skin, would break through it, either fol-

lowing a trauma or on account of a complete obstruction of the excretory canal. Thus, he could explain the intermittence of the pain and the sense of tension that vanished with the appearance of the fluid.

The course of these fistulæ has been in all cases very simple, and they have yielded easily to treatment. However, in our case, the injections of the tincture of iodin and the galvanocauterizations, which usually prove successful, were insufficient. It was then that we conceived the idea of trying Beck's paste, which we were using to influence fistulous tubercular tracts, and healing followed rapidly and completely.

Since, to my knowledge, Beck's paste has never been before used in the healing of salivary fistulæ, having obtained such a result, I deemed it opportune to report my case.

XVIII.

FISTULA SYMPTOM IN NONSUPPURATIVE DISEASES OF THE EAR.*

By Oscar Beck, M. D.,

Vienna.

The assertion can now confidently be made that it is very rare to find cases in which an accurate functional examination of the inner ear has been carried out, where operation reveals a previously unrecognized labyrinth fistula. This excludes, naturally, those cases in which there is a complete abolition of reaction of the labyrinth to every irritation.

On this account those unusual conditions of the vestibule are the more interesting in which movements of the eyeball are obtainable through increased or diminished air pressure in the external auditory canal, although the most careful inspection of the inner wall of the middle ear has been carried out during operation without revealing any fistula or other anatomic explanation for the occurrence of these artificially produced movements. Alexander, LaSalle, Bárány, Ruttin, E. Urbantschitsch, among others, have reported well authenticated observations of this kind. In all these cases, however, there existed suppuration of the middle ear, or there were, as in the cases reported by Alexander, easily demonstrable remains of a previous otitis, such as perforations in the drum membrane, cicatrices, etc. Hennebert and Buys, and later Alexander, have reported movements of the eye in patients with hereditary syphilis and nonsuppurative middle ear disease, which could be excited by the performance of the fistula test. The original report of the interesting cases of Hennebert were unfortunately not accessible. Before I take up in detail the vestibular condition of my cases, I wish to refer to the most important points in their clinical history.

Case 1.—Hereditary syphilis. The father of the patient, a girl of eleven years, was married three years after the pri-

*Translated by Thomas J. Harris, M. D., New York City.

mary infection. His wife had had two miscarriages. The patient was an eight-month child, and was always delicate, without ever having been seriously ill. When eight years old there developed an affection of the eye that was treated locally with mercury by inunction. For about a year the parents had remarked a diminution of the hearing, although the child was very intelligent. For the last four months she had complained of subjective noises in both ears, on the right side more than on the left. These were described as resembling a whistle, which occurred at times, especially when excited, lasting several hours, then entirely disappearing for several days. She had never had vertigo nor vomiting, and there was no uncertainty in her gait.

Status Praesens.—The nerve and internal condition were negative. In the left eye there were the remains of a keratitis parenchymatosa. Wassermann positive.

Condition of the Ear.—Drum membrane, both sides showed slight catarrhal alterations. Weber positive to the left; Rinné, both sides positive; diminished for air and bone conduction; much stronger right than left. Perception of the high tuning forks on both sides decidedly diminished. Right ear, conversational voice, 1 meter; whispered voice, 0; left ear, conversational speech, 5 meters; whispered voice, 2 meters. Spontaneous nystagmus toward the right and left, but not always present. Caloric reaction (26°), both sides normally present. Turning reaction, ten times right, thirty-five seconds; ten times left, fifty seconds. Nystagmus after rotation to the left much stronger, with marked vertigo and nausea. On account of the changing spontaneous nystagmus, no examination was made with the galvanic current. Neither aspiration nor air compression in the left external auditory canal caused any change in the bulbi. Air compression in the right external canal caused both bulbi to move slowly to the right canthus and return slowly again, on the letting up of the compression, into the middle position. Air aspiration caused both bulbi to move slowly to the left. Light vertigo followed the compression.

I demonstrated this patient in one of my private courses on syphilis of the ear, and my attention was accidentally called to this interesting phenomenon. Only as the result of the thoroughness of a labyrinthine examination, which demon-

strated the presence of the fistula symptom, was my attention called to this peculiar phenomenon. The patient remained three weeks under observation. During this time she was given a course of mercurial inunctions. The labyrinthine condition was demonstrated by me a number of times. Later the parents departed with the child for their home. Since that time I have not seen the patient.

Case 2.—Acquired syphilis. History: A. N., age thirty-two years, four years previous to being seen had acquired a primary lesion and was treated lege artis at the skin clinic. With this exception he had never been sick. The patient never complained of ear trouble. He stated that for the past two months he had suffered from a sensation of vertigo and unsteadiness in walking, especially in the dark. He had the tendency in walking to bear to the right, but, also, at times, toward the left. Quick movement of the head intensified the feeling of dizziness. He is not able to turn around, but always instead makes a curve. The hearing has diminished in the right ear.

Status Praesens.—The eyes, the general condition, and that of the nerves, with the exception of a slight increase of the patellar reflex, were negative; in the right axilla a circinate syphilid—Wassermann strongly positive.

Ear Condition.—Drum membrane, both sides normal. In the left side the process of the incus is visible. Left ear, normal hearing. Right ear, conversational speech, 4 meters; whispered voice, 1 meter. Weber lateralized to the left. Rinné, right, positive; air conduction slight; bone conduction decidedly diminished. Right side, lowering of the upper tone limit. Vestibular apparatus, spontaneous rotatory and horizontal nystagmus toward the left by looking to the left; very slight by direct view; negative by looking to the right. Eyes directed upward or downward, negative. Romberg, pronounced swaying of the entire body without falling in any definite direction. Change of the position of the head has no perceptible influence in the direction of the swaying. The left ear, caloric (26°), normal reaction. In the right ear, after a few seconds of irrigation, there developed pronounced nystagmus of the third grade to the left; the patient became pale, perspiration appeared on the forehead, pronounced nausea. This nystagmus lasted almost two and a half minutes

and then gradually diminished in intensity. Rotation reaction, ten times right, forty seconds; pronounced nystagmus with vertigo; ten times left, one minute forty-five seconds; exceedingly severe nystagmus with nausea and pronounced vertigo. When the patient's head is quickly turned toward the right shoulder there develops a marked nystagmus associated with much vertigo. Compression of air in the right auditory canal gives a rotatory and horizontal nystagmus to the left; aspiration a similar nystagmus to the right. The compression nystagmus is much stronger than the aspiration nystagmus, and the feeling of vertigo is also more pronounced. I was able during a period of two weeks to excite this phenomenon. The patient was treated with injections of calomel. He has disappeared from observation, so I have not been informed regarding the outcome of his case.

We have, then, two patients in whom movements of the eyes could be effected by compression or aspiration of air in the external auditory canal. The little girl with the hereditary lues showed with compression a slow movement of both bulbi, the man with the acquired syphilis, a fistula nystagmus with rotatory and horizontal components. The quick rotatory component was directed by compression to the healthy side, by aspiration to the diseased side. It corresponded, therefore, to that type of fistula symptoms which we designate as inverted fistula symptom. In neither of these cases was any history of suppuration obtainable, and the condition of the ear drum spoke against such a possibility. The question accordingly arises, how is it possible, in the absence of suppuration, with an intact ear drum and presumably intact ossicular chain, to produce bulbus movement through increase or decrease of the air pressure in the external auditory canal? According to Alexander there are three possible explanations. First, in the intensity of the air pressure increase; second, in the favorable or unfavorable circumstances through which this increase of pressure can be transplanted into the labyrinth; and, finally, in the irritability of the labyrinth itself. The intensity of the air pressure increase scarcely can enter into consideration. I believe, with Alexander, that we can exclude this, since in all of our investigations in the clinic we always made use of the same size balloon and of an olive which accurately closed off the audi-

tory canal, so that the difference in the pressure in all the cases would be virtually the same. Alexander, in his own material, did not find a single case in which, as a result of the increased irritability of the labyrinth, it was possible to get a compression nystagmus.

The factor of increased irritability of the labyrinth seems to me not important for the explanation of this nystagmus, because we can demonstrate that an increase of the pressure in the auditory canal, which under normal conditions in the inner ear can produce no effect upon the vestibular apparatus, can in a very sensitive vestibular apparatus irritate it and call forth a nystagmus movement.

In Case 1 there existed on both sides a normal irritability for the thermic test. On the other hand, rotation reaction produced in the diseased ear in each case a nystagmus lasting fifty seconds. In Case 2 we find an unmistakable increased irritability for cold and warm irrigation, and a rotation reaction giving in each case a nystagmus of almost two minutes, accompanied by pronounced subjective symptoms. Both cases showed an increase in the reaction for the rotation test.

Now, the turning reaction has a decidedly greater effect upon the lymphokinetic apparatus, and also the fistula test represents a mechanical force working on the endolymph. We know from a large number of observations, as well as from the studies of Ruttin on serous labyrinthitis, that in pathologic cases the caloric reaction loses its effect with relatively slighter changes than does the turning test, and the fistula test is lost first with pronounced changes. The fistula test, therefore, produces not merely a pure mechanical action on the endolymph, but represents also the strongest stimulus which we are able to bring to bear upon the labyrinth. These two factors in conjunction with the increased irritability for the turning test are sufficient to explain the compression and aspiration nystagmus met with in a normal drum membrane.

When we come now to a causative relationship between the abnormal irritability of the lymphokinetic apparatus on the one side, and the positive reaction for the fistula test with an intact ear drum on the other, one circumstance demands further explanation. When does only a slow movement of the eyes arise, and when does a vestibular nystagmus take place with rapid and slow components? Ruttin has given the fol-

lowing explanation in purulent diseases of the middle ear, to clear up the question when we are able to produce by the fistula test merely a deviation, and when we can produce a typical nystagmus:

When, as a result of favorable pathologic anatomic conditions (i. e., the size of the fistula and the free channel for the compressed air stream), the irritation is great, then there results from the vestibular irritation, which causes a slow movement of the eyes to the opposite side, a central reaction in the form of a quick reverse movement. This gives a nystagmus to the same side. If, however, the irritation produced by compression is, as a result of unfavorable anatomic conditions, slight, then no central reaction follows the vestibular irritation, but first a slow reverse movement on the cessation of the irritation.

The most important of that which we regard as favorable or unfavorable anatomic conditions (i. e., the size of the fistula and the free accessibility of the compressed air) is, in the last analysis, the greater or less effect of the irritation on the endolymph; that is to say, on its locomotion. In cases with normal middle ear, this is virtually lacking, as I have already mentioned. Nevertheless, I regard the opinion of Ruttin as the most plausible explanation for my cases also. The analogy of a favorable form of irritation is found in my second case, which gave a typical fistula nystagmus, shown in the increased irritation wave for all stimuli; while the patient with the congenital lues, who showed a slow deviation, was positive only to the turning action, and showed no increase for the thermic test. This patient also had no nystagmus attacks, which were producible in the other case by bending the head. Bárány believes this phenomenon to be retrolabyrinthine in origin, and everyone who has examined nervous patients and tumors of the vestibular apparatus, agrees with this explanation. When, however, as Breuer has shown, one or two movements of the head are sufficient to produce violent nystagmus, we must believe that with such an abnormal irritability of the labyrinth it is not always central in origin.

The question where upon the lateral wall of the labyrinth the air compression or aspiration produces its effect, belongs for the most part with the question regarding the increased mobility of the stapes; that is to say, with the much discussed

question regarding the existence of the stapes fistula. Bárány showed a patient in the Austrian Otological Society with positive Wassermann, who had acquired syphilis twenty-two years before. For ten years he had suffered from difficulty in hearing in his right ear, with tinnitus and vertigo. The functional test gave a slight alternating spontaneous nystagmus. Movements of the head produced no nystagmus. The caloric reaction was diminished on the diseased side. The turning reaction gave about twenty seconds on both sides. Slight movements of the eyes were demonstrable with compression and aspiration, and were accompanied by vertigo. Bárány asks whether this arises from increased irritability of the labyrinth, or from an abnormal mobility of the stapes, as the result of syphilitic periostitis of the labyrinth. From the circumstance that the patient at times suffers from vertigo and at times is free, while the movements of the eyes are always of the same intensity, Bárány believes that we have to deal with an abnormal mobility, since if an increased irritability were the cause, it would be necessary to assume that the vertigo changes according to the subjective condition of the patient.

In cases of abnormal mobility of the stapes we have to deal according to Bárány, not with a nystagmus, but slow movements of the eyes. Alexander, on the other hand, believes that a compression nystagmus from fistula symptoms should be differentiated by the fact that in every case of labyrinthine fistula there is in the beginning of the formation of the fistula the history of a characteristic vertigo. Whether and how far the argument of Alexander has justice in it, would call for more discussion than the extent of this article would permit. In any case, however, this differential diagnostic factor concerns itself primarily with purulent processes. Alexander's explanation was intended only for such, and in my case with normal middle ear, it scarcely can be taken into consideration. It is my opinion that an abnormal mobility of the stapes is in all these cases of normal middle ear the chief explanation for the phenomenon, both of the slow movements of the eyes and the typical fistula nystagmus, since the anatomic conditions on the inner wall of the ear seem to speak against the possibility that any other place can be regarded as the point of attack for the irritation. Both cases showed, also, more

pronounced subjective and objective symptoms by compression than they did by aspiration.

When, however, only slow deviations and when typical nystagmus will result, appears to depend upon the particular conditions producing the irritability in the labyrinth; peculiar conditions of irritability which can be demonstrated in a number of cases of hyperirritability, but need not necessarily be present. This Bárány has shown in the case of diminution of the caloric reaction and a turning reaction of twenty seconds' duration. Only slow movements of the eyes existed. The case of Alexander, on the other hand, with hereditary lues, showed, with the caloric irritability preserved, a lack of response to the turning reaction, and in spite of this, as the result of the fistula test, a very pronounced nystagmus. It requires no further comment to see that we have here a particular and entirely atypical condition of irritability in the vestibule, since we are accustomed with pathologic conditions to see a weak caloric and then a strong irritation test disappear. At the April meeting of the Austrian Otological Society this year I demonstrated a child with congenital syphilis, who showed, nevertheless, a positive reaction to the fistula test. There was complete deafness on the diseased side and lack of response to the thermic and turning reactions. In spite of this, central vestibular reactions were preserved and could be demonstrated by the turning test, and a contradictory sensation was produced in all our examinations.

This case, which I have not reported in the previous work, shows that in syphilis very complicated conditions are met with in the labyrinth, and that these marked changing pathologic conditions, at least in this group of cases, can produce their effect pronouncedly on the labyrinthine fluid.

XIX.

A CASE OF PROBABLE INJURY TO THE JUGULAR BULB FOLLOWING MYRINGOTOMY IN AN INFANT TEN MONTHS OLD.*

By John Randolph Page, M. D.,

New York.

This case was admitted to Dr. Duel's service at the Manhattan Eye, Ear and Throat Hospital last July, with a discharge from both ears of six weeks' duration, temperature 102.6° and considerable digestive disturbance. The house surgeon, Dr. Gallivan, found both drum membranes bulging posteriorly, so he performed a double myringotomy, the baby being swathed and no anesthetic used. After the myringotomy on the left side a profuse hemorrhage occurred; so profuse that it was thought best to pack the external auditory canal to control it. After this the child bled from the nose for a few minutes. On removing the packing at the end of five or ten minutes no further hemorrhage occurred. The ears were irrigated every three hours and the child kept under observation. The temperature, after a slight rise, gradually fell to 100.4,° but twenty-four hours later went to 105.° The attending physician, Dr. Sammis, reported some enteritis with the ear condition and ordered treatment accordingly, but the temperature continued to rise to 105° every night, in spite of apparent improvement in the ears and in the intestinal condition.

Blood examination showed no malaria, 14,000 leucocytes, 74 per cent polynuclear neutrophiles, but sufficient quantity could not be obtained for culture. Possible infection of the left jugular bulb was thought of from the first, but the extreme youth and delicate state of the patient made us particularly loth to operate unnecessarily. On the third day after admission, however, as the temperature the night before had again

*Presented before the Section on Otology, New York Academy of Medicine, November 14, 1914.

gone to 105,° the child was sent to the operating room for the purpose of having her left jugular resected, although there was practically no discharge from either ear and the skin over the mastoids was thin and entirely free from edema. The intention was to open the mastoid merely to block off the sinus and prevent return flow of infection from the bulb, and then, as rapidly as possible, to ligate and resect the internal jugular. To our surprise, on incising the thin skin over the mastoid, we found the cortex of the bone darkened, and when this had been removed, the antrum and cellular structure over the knee of the sinus filled with creamy pus, cultivation from which showed streptococci. The extensive involvement was so unexpected that operation on the other mastoid was now considered rather than operation on the jugular, as the external signs in it were just as sufficient to warrant operation as they had been on the side just exposed. Accordingly, the right mastoid was opened and practically the same condition was revealed. There was no exposure of the sinus or dura, as sufficient cause for the septic temperature was thought to have been found. On the following morning the temperature reached 105.8° and during the following night 105,° so the next day it was again decided to remove the left jugular. The sinus on this side was exposed and incised, but no attempt was made to demonstrate a flow of blood from the bulb. Because of the infant's tender age it was packed quickly after incision and obliterated without an appreciable loss of blood. The jugular was then excised, but not without delay and embarrassment, owing to the large number of lymphatic glands which are always present in the neck of a child of this age, although they were not very much enlarged nor apparent until after the incision was made. Nothing pathologic could be noticed macroscopically in the vein itself, and it appeared to fill readily. As the neck was naturally short, the whole exposure was hardly more than an inch. The vein was ligated and excised, filled with blood, but unfortunately was not properly preserved for examination. The temperature the following day did not go above 104,° and after that it gradually subsided to normal, with an uninterrupted recovery of the patient.

Since Dr. McKernon in 1905 called attention to the occurrence of primary jugular bulb thrombosis in children with

purulent otitis media, and the close relation anatomically of the bulb to the floor of the tympanum, a number of other men have reported similar cases. In a short search in literature I have found no case where injury to the bulb had been reported after myringotomy, although I know of an instance where injury to the bulb occurred during the radical operation. It seems singular on observing temporal bones from children of this age that such injuries are not more common after myringotomy, particularly as high bulbs with a little if any bony separation between them and the tympanum are not infrequently met with. There is, I think, reason to believe that there was injury to the bulb following the myringotomy in this case, and consequent infection of it, although there is of course no definite proof that this was the case.

XX.

COUNTRECOUP FRACTURE OF THE SKULL.*

By T. R. Chambers, M. D.,

Jersey City.

Mrs. S. V., aged sixty-four years, had in 1888 six days of O. M. P. R., but the ear was dry afterwards.

March 19th last, three months ago, fell from ladder on porch, a distance of eight feet, to sidewalk, striking left temporal and occipital regions, sustaining a probable fracture of skull (diagnosed at the time as on the left side, where there were a subscapular hematoma and some superficial lacerations of scalp). She was unconscious for a half hour. She recovered, but complained for five days of pain in the right mastoid region. For three months she was well.

On June 16th a dentist was consulted for a dull pain in a tooth on the right side, radiating posteriorly. The dentist could find nothing to do for the tooth. Then pain and deafness, but no discharge, occurred in right ear.

June 25th, Dr. T. J. B. Meury was called and ordered hot douching for right ear. July 2d, there had been no sleep for forty-eight hours, owing to pain in right mastoid region, and a temperature which had been two figures, suddenly rose to 103.8.° There was also pain in right shoulder. She reluctantly consented to enter Christ Hospital. She was seen by me immediately on entering. She walked, talked perfectly and rationally and read print; had no nystagmus nor dizziness. The auditory canal was not swollen, nor did the tympanum show disease except slight injection. There was no pain on pressure over mastoid antrum or tip, but there was pain on pressing on a firm tumor the size of a walnut, which was seen posterior to the mastoid. My first impression did not realize the seriousness of her condition, and I was inclined to use expectant treatment before operating—perhaps the next

*Presented before the Section on Otology, New York Academy of Medicine, November 14, 1913.

day. But the temperature being taken and found to be 104.8,° she was immediately placed on the operating table, after preparation and the administration of a hypodermic of morphin and atropin. She took the anesthetic kindly. A rather wide mastoid incision was made, and this incised across its center. This cross incision divided the tumor, which was firm and seemed to have existed many days. A few drops of pus came from the mastoid body, but the antrum was clean, as was also the iter ad atticus. Immediately under the tumor growth was found softened bone, and a few drops of pus exuded from a crack in the bone. This fracture was an inch in length, extending from the occipitotemporal junction forward. The bone was spooned out and a cavity large enough to admit the first phalanx of the little finger was found, where evidently had been an epidural hematoma. When all diseased bone had been removed a large opening existed which included the opening made in the mastoid body. The floor, made up of the pulsating cerebellum and sinus, looked healthy and everywhere resisted gentle probing. Iodoform gauze was lightly packed in the space and a few stitches taken superiorly, but free drainage allowed. The patient did not come out of the anesthetic for ten hours. The temperature fell two degrees for a few hours, then steadily mounted to 105.8.° There were terrible pains complained of between attacks of coma. The next day, on removing the dressings, they were found dry, and the wound looked black with no attempt at repair. The patient died eighteen hours after operation. Postmortem examination was refused.

RETROSPECT.

1. What connection was there between the toothache and the beginning of symptoms?

2. The remarkable toleration shown for three months for the large hematoma which gave no symptoms—or rather none were recognized.

3. Attention was misdirected by the left sided injury seen: and the importance of the right sided injury, because unseen, failed of recognition.

If a simple trephining had been done early, and the fractured bone and hematoma removed before they had begun to break down, the life of the patient would have been saved.

XXI.

CANCER OF THE LARYNX WITH SPECIAL REFERENCE TO RADIUM THERAPY.*

By Joseph C. Beck, M. D.,

Chicago.

There has no doubt been a great deal more interest aroused in the cancer question, especially among the laity, in the past two years than in the ten years previous, and it appears that the tremendous agitation in tuberculosis has had a great bearing on this. It is certain that this agitation had very definite and beneficial results in reducing the mortality from tuberculosis, as well as the spread of the tubercular disease itself. By applying the same amount of enthusiasm in attacking cancer from all sides, especially by the education of the laity and the early diagnosis by physicians, we may hope to bring about results which up to the present time are entirely wanting. It appears from reports in general as well as those of laryngologists, that carcinoma is on the increase. I am inclined to agree, by reason of my experience, with the opinion that this is only an apparent increase, inasmuch as better methods of diagnosis are invoked for carcinoma, and the differential diagnosis for lues, tuberculosis, rhinoscleroma, etc., and carcinoma is easier of accomplishment.

The second session of the Clinical Congress of North American Surgeons, when a special committee was appointed to formulate methods of gathering all possible data to fight this terrible malady of cancer, has had a marked influence in promoting the possibility of accomplishing some good. At the last session, the discussion all tended to the early diagnosis and early operation, concluding that thus far the only chance in saving any case was by means of early thorough surgery. An important suggestion was made in the direction of enabling one to make a correct report of the ultimate result of cases

*Read before the Middle Section of the American Laryngological, Rhinological and Otological Society, Detroit, February 23, 1914.

operated upon. This consisted in what is termed the "follow-up system." After a patient has recovered from the operation and has been discharged, he is informed that when he receives a stamped envelope from the doctor, he is to answer the questions and return at the earliest convenient time. The stamped envelopes with record sheet questions are sent out at definite periods of three months, six months, one year, two years, five years after operation, and after that as often as one wishes to know how that patient is getting on, with special reference to recurrence. The question of ethics in this matter should be waived in favor of the possibility of having the correct statistics.

In regard to cancer of the larynx, I believe there is not much difficulty in the diagnosis, in the presence of the cardinal symptoms of persistent hoarseness, particularly in older men. Yet in every instance a differential diagnosis as to lues, tuberculosis, rhinoscleroma, sarcoma and other neoplasms should be made by laboratory methods especially, before resorting to the removal of particles of tissue for microscopic examination to confirm the diagnosis. Why males should be more frequently affected is not definitely known, but the writer believes that the greater likelihood of exposure to irritants with greater reaction due to the stronger development of the muscular apparatus of the larynx may have something to do with it. The fact remains that I have observed one hundred and seventeen cases of carcinoma of the larynx, and only two were in the female. I performed laryngectomy on one of these eight years ago, and she has had no recurrence. Although the case was diagnosticated carcinoma clinically as well as by microscopic examination, I am at times inclined to believe that perhaps there might have been a mistake in the diagnosis.

The type of carcinoma most frequently found is the epithelioma. Crile made a statement a few years ago that carcinoma of the larynx, when operated upon early, gave the best chance for cure of any deep seated carcinoma, because it was contained within the cartilaginous box, and cartilage is very difficult of invasion by carcinoma. His results undoubtedly prove his statement, but his results stand out away ahead of those of any one else in this country. Why is this? I should say it is because the cases are well selected and a perfect surgical technic acquired. My own personal expe-

rience with laryngectomy for the cure of cancer is most pitifully discouraging, yet I am confident that this must be due to the poor material that I have had. Most of my cases were quite advanced, with involvement of the posterior or esophageal surface. I have had a fair number of cases in which an early diagnosis was made, but invariably the patients, as well as the physicians referring the case, insisted and urged the more conservative method of laryngofissure, with the removal of the growth within the larynx. The majority of these cases operated upon by the more conservative methods had recurrences, and then implantation recurrent carcinoma was invariably the result, when subsequently a laryngectomy was performed. This is the point that Crile as well as Gluck make, that in order to get the best results the larynx should be removed unopened. I have performed eleven laryngectomies with two recoveries; both are still alive and are without recurrence; one case, a male, sixty-three years old, eight years since operation, and the woman mentioned before, six years since operation. Of the nine deaths, four were within a week or ten days after operation, either from pneumonia or septic mediastinitis. The remaining five died within a year and a half from general carcinosis. I have operated by conservative methods nineteen times; sixteen laryngofissures and removal of the neoplasm, twice by indirect laryngoscopy and once by direct laryngoscopy. Of these sixteen cases of laryngofissure, four are in the group of subsequently laryngectomized, ending fatally. Seven had recurrence and also ended fatally within about one year. Of the five remaining four are alive. The oldest was operated upon twelve years ago. This was a fruit peddler, whose occupation was to cry his wares from a wagon. I removed the entire cord and the ventricular band as well as the tissue below the cord for about one-fourth of an inch. Microscopic examination showed clearly the carcinomatous degenerations (epithelial pearls). Of the other four cases that are still alive, the most recent was operated upon two years ago; he has a recurrence and is one of the cases that I am reporting on in detail, in regard to the use of the radium. Four cases, therefore, of the entire sixteen laryngofissures are still alive and three free from recurrence. While they have no recurrence they are by no means perfect as far as their voices are concerned; all have considerable

hoarseness or huskiness. The two cases operated upon by the indirect method date back fifteen and thirteen years ago; both were ideal cases for either laryngofissure or laryngectomy. Both had recurrence. One was operated by another surgeon subsequently by laryngectomy, and died within a week, and the other died of general carcinosis. The one case operated upon by the direct method is too recent to be of any definite value as to ultimate result, but I wish to mention it because the patient is in excellent condition now, three months after operation, with apparently no recurrence. I employed the suspension method of laryngoscopy, and the performance of this procedure was the easiest of any intralaryngeal method that I have ever used. I performed this operation by this route because his relatives would not permit any external operation. As to other methods of treatment, one may enumerate the following, which are at present in vogue, and which I have employed to some extent. I will, however, report on my result from radium at this time, and at some future date the results obtained from the other remedial agents.

1. Radium.
2. X ray.
3. Fulguration and diathermia.
4. Autolytic solution.
5. Colloidal copper and mercury.
6. Trypsin and amylopsin.

In regard to radium, I would say at the outset that I have seen no permanent cure; in fact, there is little encouragement for the cure of cancer of the larynx when the cases usually present themselves to us for this treatment. Yet in the evidence of the remarkable results that are reported in the treatment of carcinoma elsewhere in the body, particularly in the more superficial areas, we must not condemn this most wonderful remedy without giving it a very thorough trial. I am absolutely certain that superficial carcinoma or epitheliomata will disappear, because I have treated such cases with permanent disappearance of the growth. I am also certain that in the carcinoma of the larynx certain gross as well as microscopic changes take place which may be taken as suggestive of destruction of the cancerous tissue. My experience with radium dates back to 1904, when I published my first report.[1] I experimented with a small

quantity of radium, being informed that it was sufficient to influence beneficially the growth of cancer. That report I take pleasure in passing, and it will be noted that I stated in the article that I had absolutely no result from its use in carcinoma of the larynx. Since then I know that the information as to sufficiency of the quantity was incorrect; furthermore, the quantity was not what it was represented to me, although I had it tested for radium. After these early experiments I gave up its use, and not until 1909 did I again try to treat a case of carcinoma of the larynx. The patient was a lady, the wife of a physician. At this time I employed a larger quantity of radium, but without any result. The same results followed its use in three other carcinomata of the larynx, and so I again gave up its use and made a report to that effect in February, 1910.[2]

Last year I began to notice some excellent reports, particularly from abroad, on the use of radium in inoperable carcinoma, and the statement was made that much larger quantities of radium were necessary. The radioactivity was found not to be so important as the amount of pure radium—not radium salt—that was employed, although it is only to be utilized in the salt form.

At about this time I had a case of carcinoma of larynx, which I have already mentioned and which I will report in detail. The patient having read and been told of the wonders of radium, preferred to take his chances with radium rather than laryngectomy, and I readily consented to treat him by this method.

The radium that I am employing is the sulphate salt of radium, 19.8 milligram, which contains 10 milligrams of pure radium element. As stated before, it is the quantity of radium element and not the salt that is essential. When we speak of how powerful a dosage we are employing, it does not matter whether it be the sulphate, bromid or other salts of radium that is used; the only difference between them is that the bromid salt is soluble, and the sulphate and others are not. In addition to this quantity (19.8 radium sulphate), I borrowed the radium belonging to Dr. Simpson, of Chicago, 11 milligram of radium with barium, containing 50 per cent radium element, or 5.5 milligram. His radium is imported from the Curie laboratory of France, while ours is the American product of the Pittsburg Radium Company.

Both these radium masses have been tested and are guaranteed to contain the above stated quantities of the element.

I have selected four cases of larynx carcinoma, three only of which, however, are going to be of definite value, as the fourth has discontinued treatment. Yet this fourth case is worth while mentioning, inasmuch as a very interesting phenomenon from the effect of radium was observed in his case.

RADIOACTIVE SUBSTANCES AS RADIUM, MESOTHORIUM AND THORIUM.

As we speak of a Roentgen ray emanating from the Crooks tube, so we may speak of the Becquerel rays when employing radium, mesothorium and thorium.

The qualitative unit measurement of radium is known as a Curie.

There are three groups of radioactive substances considered:

1. Uranium.
2. Thorium.
3. Actinium.

These radioactive substances are constantly undergoing changes and new ones are thus developed. Each of these reformed substances has a different time limit as to existence and radioactivity; for instance, in radium there occurs a division into radium emanation and a substance in ray form, known as helium. This radium emanation again subdivides into rays of radium which are spoken of as radium B, C, D. E. and F.

The time limit of the existence of radioactivity is characterized by what is called "half period limit." that is to say, when about one-half of its activity is lost. So, for instance, the half period limit of existence of radium is spoken of as 2000 years, while the half period limit of radium emanation is only 3.8 days, and that of thorium emanation is 53 seconds.

In the thorium and actinium groups we have:

1. Thorium.
2. Mesothorium I.
   Mesothorium II.
3. Radiothorium.
4. Thorium X.
5. Thorium emanation.
6. Thorium B, C, D, E.

There are three types of rays in these radioactive substances, namely, alpha, beta, gamma, and they all have a different penetrating property. They are also represented in different proportions. The alpha, or the most superficial rays, are at least nine-tenths of the rays present. They are always spoken of as atomic particles of the socalled new element, helium. These rays may be easily filtered, even by thin paper or rubber.

The beta rays are somewhat deeper in their penetration and are analogous to the cathodal rays emanating from the Crooks tube. Some of the beta rays have about the penetration of the alpha rays, that is, not below the skin, while a small proportion have as great a penetration as the gamma rays. One-half of the beta rays, however, can be filtered by a 5 mm. thickness of aluminum plate.

The gamma rays have a tremendous penetrating power. Lead plates of many centimeters' thickness will not absorb all of them; however, there are only a small percentage of these rays present.

Filters are very important in the application of radium, in order to be able to treat different depths, leaving the superficial areas untouched.

The accurate measurement of radium application can be equally as well done as in X-ray, and the "Mache-Unit" is employed, especially in Germany, for this purpose.

The action of these rays on the various tissues has been very carefully studied by Hertwig, and he has found that embryonal tissue especially was markedly retarded in its action, and in many instances destroyed, by radium rays.

Exner[3] has observed the action of radium on subcutaneous cancer, and the following are his findings:

After applying the radium (quantity not stated) for half an hour each day for one week, he finds small necrosis and bleeding in the skin and the underlying tissue. The epithelial cell masses are separated, and newformed connective tissue is seen in the interspaces. The cancer cells themselves do not appear to be changed at first, but later are. Therefore, there are found two types of changes after treatment by radium in cancer, namely, newformed connective tissue, and destruction of the cancer cells. The development of the connective tissue is the most active and earlier than the destruction of the cancer cells.

The preference of radium to the X-ray in many instances is very apparent. It is much easier applied and can be employed in regions where the X-ray tube cannot; as, for instance, it can be placed into the tissue itself for an indefinite period of time.

It also has the gamma rays, which are deeper than any of the rays thus far found generated by the X-ray tubes. The radium employed is, as mentioned before, in the form of salts and not in pure form, either sulphate, bromid or other forms, and it may be placed in capsule, tubes or on varnish plaques. Solutions may be employed of the radium itself, or solutions of radium emanation.

TIME OF APPLICATION.

Usually from one-half hour to two or three hours is allowed at first, but it has been used as long as a week or ten days at a time. The following formula indicates the method of measurement:

10 mg. of radium employed for ten hours makes a one hundred mg. hour application. The reaction to the skin will guide one in the continuing or withholding of the application of radium. One must be very careful in the use of radium in close vicinity to the eyes, as to possible affection of the cornea. These changes have been experimentally produced on rabbits by Chalupecky.[4]

MESOTHORIUM.

Hahn, who first discovered this substance, finds that it contains about 25 per cent of radium, and has a much shorter lifetime (a few years only). It is a product of thorium. One of the points in favor of mesothorium is the great quantity of soft beta rays which it contains; another important factor is the difference in price, about one-third that of radium. In consequence of these factors, mesothorium is very much in demand in the treatment of inoperable carcinoma.

Thorium X is obtianed in solution and is used as an injection for general treatment of carcinoma, through the circulation as well as locally in the vicinity of the tumor. It is obtained in ampullar form. It loses very rapidly in its action—half its value on the third or fourth day. At times intestinal disturbances follow its administration, but they are only transitory. It is also employed as a drink, in pills, gargles, inha-

lations, as dusting powder, and salves. The time is too recent to say what the ultimate results will be from its use, but there are already some evidences of good results.

Results from these radioactive substances are about the same as X-ray. Superficial growths are very well influenced, and in locations as the alæ of the nose, etc., where one may surgically remove the growth easily enough with a defect remaining that would require quite a plastic, radium will accomplish its results with very little scar formation. Deep seated growths are less favorably acted upon, yet by applying the crossfire action and following the principles of Gauss and Kroenig in Roentgen ray treatment of deep penetrations and many points of entrance, results similar to those obtained with X-ray were demonstrated. The gamma rays were found responsible for the results obtained in deep seated cancers, the alpha and beta rays being excluded by filters. These authors employ very large quantities (100 to 800 mgr.) of mesothorium and leave it in situ as long as a week. They also combine Roentgen and mesothorium ray treatment, and claim to obtain good results. It is valuable to give a summary of the work of these men (Gauss and Kroenig[5]) in the treatment of cancer by radioactive substances, including X-rays: Forty-six cases of cancer in various organs of the body were treated by radioactive substances without operation. Aside from the rays, injections of thorium were employed. Five of these cases died, seven discontinued treatment, nineteen are still under treatment, fifteen cases can be considered cured, as they do not show any symptoms, and tissue from the position of the previously existing tumor examined microscopically was negative as to the presence of cancer cells. Other sources report good results from the use of these radioactive substances in deep seated cancer by deep penetrations. Bumm[6] reports twelve cases of deep seated cancer cured by this method of treatment. He also believes in a radium, mesothorium and X-ray treatment before operating on a cancer, and also in applying these measures after operation. Notwithstanding the fact that these authors can obtain such good results, it is hoped that, at least at this time, no one will treat an operable case of cancer, except superficial carcinoma about the face, by these radioactive substances, because there must still be great chance of recurrence.

REPORT OF CASES.

Case 1.—Man, forty-three years old; married. Three children living and well. Two brothers living, well. Five sisters living, well. Father, seventy-two years old, living and well. Mother, sixty-nine years old, living and well. Patient has had no illness up to present trouble, except when a child of three years had some sort of hip disease, and could not walk for more than a year. About three years ago patient began to grow hoarse and consulted family physician, who told him that the trouble was due to the strain of shouting at a baseball game, and treated him by inhalations and applications to cords; as many as six treatments a week for almost two years, with little or no improvement. He was then advised to see Dr. Brobst, of Peoria, who thought the throat had been overtreated. Dr. Brobst treated the patient for three months, then said he feared cancer and referred the patient to me.

Upon examination of the larynx I found a unilateral swelling, somewhat subglottic, on the left side, near the anterior commissure. There was no interference in the motion of the cords. General physical examination was negative. Laboratory examinations, in the differential diagnosis of tuberculosis and syphilis, were made and found to be negative. Under local anesthesia by indirect laryngoscopy, I removed several small pieces from the small mass for microscopic examination, and it showed them to be free from any suspicious carcinoma, but proved to be simply inflammatory in character. Several weeks later, in consulting with his attending specialist, we decided that there was an increase in the hoarseness as well as an increase in the growth. It was decided that a laryngotomy should be done, more as a preventive measure against carcinoma development.

On May 26, 1913, under general intratracheal insufflation anesthesia of ether, laryngotomy was performed. We removed an oblong mass the size of a small cherry, from the left side, and with it considerable healthy tissue (method as suggested by Green of Boston). The thyroid cartilage was approximated and the soft tissues were sutured; no tracheotomy was employed.

Patient had considerable reaction and difficulty in breathing for about forty-eight hours, but within ten days com-

pletely recovered and primary union took place. Patient returned home for observation by his specialist, and after a week the doctor informed me that the larynx was filling up. Believing it to be granulations, I advised local applications of silver nitrate. Subsequently the histologic examination of the mass removed at the operation showed a suspicious area of carcinoma.

The symptoms were not relieved, in fact the laryngeal obstruction increased; patient came back in a week in great distress for air and a hurried tracheotomy was performed.

Examination revealed that the entire larynx was practically filled out with a reddish granulating mass. His physician and I decided that the best thing to do was to reopen and clean out the interior of the larynx, which was done. The histologic examination of this mass proved it to be a rapidly growing carcinoma, and we therefore advised a laryngectomy. This was mentioned to the patient, but he refused, preferring to be treated by radium.

In July, 5 mgr. of radium element (Curie), (property of Dr. W. A. Simpson), or 11.8 radium bromid 50 per cent, was placed within the laryngofissure against the tumor mass and allowed to remain thirty minutes. This treatment was given triweekly, gradually increasing a few minutes each time, until at the end of two weeks it was employed for one hour, three times a week. This line of treatment was continued for about one month, during which a distinct improvement was noticed. The laryngofissure now began to be quite narrow, so much so that the radium introduction was impossible. It was necessary to reopen it in order to carry out these treatments. At the end of six weeks the introduction of the radium in the fissure had to be abandoned, but it was applied externally, as near the seat of the growth as possible. At the end of two months we noted an involvement of the opposite side of the larynx and considerable swelling of the whole thyroid region. Particles of suspicious carcinoma tissue, with which the radium had been in contact, were removed, and the histologic examination showed changes in the epithelium in form of shriveling and inactivity, but quite a new formation of connective tissue. At no time, however, did the epithelial cells disappear. At the same time no decision was reached, and probably the only course to pursue was laryn-

gectomy, since the radium was not improving the condition, which was probably due to the fact that the quantity was not sufficient to destroy the carcinoma. Patient again refused laryngectomy and preferred to experiment with larger quantities of radium.

On September 30th, 10 mgr. of radium element, or 19.8 radium sulphate 70 per cent was obtained (Pittsburgh Radium Co.) by us, and treatment begun a few days later, employing the 5 mgr. of radium element, or 11.8 radium bromid, mentioned above, together with the 10 mgr. radium element, or 19.8 radium sulphate, by the crossfire system.

The larger amount was placed within the existing laryngofissure, and the smaller amount externally, and allowed to remain in situ for about two hours. This crossfire treatment was given three times a week for the same period of time at each treatment. On the alternating days the larger amount was used alone for the same length of time (two hours), within the laryngofissure. Within ten days marked improvement was noticed, in that the laryngofissure became larger, the swelling subsided, and inspection within the fissure could be easily obtained. Not only did the local condition improve, but his general condition as well, for he gained sixteen pounds in weight within three weeks.

This line of treatment was continued for six weeks, at which time symptoms were noted, namely, evening temperature, 100° to 101° F., a general breakdown with corresponding loss of weight, appetite, and sleep. Treatments were now discontinued in the belief that the trouble was due to some toxemia from the excessive use of the radium. The patient was sent home for ten days, to see what effect rest from treatment would have on this general condition.

Patient returned, stating that his condition was improved; he had no fever when treatments were suspended.

Repeated removal of small pieces of tissue for microscopic examination during these treatments always showed the same changes, namely, that the epithelium did not stain very distinctly, and there was an increase in connective tissue.

About two months after crossfire treatment with radium, we noted a swelling in the right side, in the region of the thyroid cartilage, but positively no evidence of any gland in the region of the neck, or any other metastases in any part of the body.

On December 12th, radium treatment was again given, now being employed in the large dose (19.8), within the larynx as well as externally over the site of the swelling, on alternating days, two hours at each sitting. Apparently there was no improvement following this treatment; in fact, swelling on the right side seemed to be increasing in size.

All this time there was practically no interference with the action of swallowing, and upon examination by way of the oral cavity a general edema about the arytenoids was noted.

Making a small incision quite distant from the laryngofissure over this right sided swelling mentioned above, in order to remove a small piece for microscopic examination, I came upon an area the size of a small hazel nut, which felt very soft, and when incised it was found to contain not a particle of fluid or substance, but it was only a dead space. Small pieces of tissue excised from this region were subsequently found by microscopic examination to be carcinomatous. This incision was united; it healed by first intention.

Patient seemed to be gradually getting systemically worse, so far as his general condition was concerned, but daily treatment was continued, always for two hours, for another month. Suddenly the entire integument over the right side of the thyroid region broke down and there appeared a cauliflower mass. On manipulation this mass appeared to be entirely free from surrounding tissues except at the upper portion near the thyroid cartilage, and it seemed as though it could be lifted out. Believing that a great deal of septic absorption from this mass was causing the patient's elevation of temperature, I decided to remove it bluntly, and it came off en masse with practically no bleeding or pain. The temperature remained normal for several days after this procedure. Radium treatment, however, was still continued, and patient showed decided improvement locally as well as generally.

Since January 15th, radium treatment was given three hours at a time, and occasionally it was left within the larynx for a twelve hour stretch. Improvement in the local as well as general condition was very apparent, and the excision of particles of tissue from the suspicious area, made in March, showed microscopically that the carcinoma cells lost their staining ability, especially their nuclei. The connective tis-

sue was found in a peculiar arrangement, in that the fibroid band appeared to be greatly spaced, and there were many areas of round cell infiltration.

March 15th the patient was in excellent physical condition, and the local appearance of the larynx treated by radium was good. A thorough physical examination failed to disclose any metastasis anywhere. The Abderhalden test, as well as the urochrom test (Davis), were strongly positive for carcinoma.

March 20th the patient developed an uncontrollable cough and a very marked cachetic condition. Patient refused nourishment and wished to sleep all the time. A metastatic condition of the lungs was suspected. The radium treatment was discontinued and patient sent home, in expectation of a fatal termination. The local condition of the larynx, however, was looking very favorable.

May 20th. Saw patient in consultation with Dr. Brobst while in his city, and found a remarkable change in the patient, in that he appeared more emaciated, much better color, taking liquid food and more interested in everything about him. Temperature normal, and the right side of the laryngofissure appears healed, smooth and soft. On the opposite side there still appears to be evidence of cancer. It is intended to employ more radium on the patient.

There is a peculiar phenomenon, as mentioned by the patient and his family, and that is, on the approach of a storm, especially when accompanied by lightning, he exhibits some uneasiness so that he cannot remain still or in one position more than two or three seconds, continually moving about until the storm has passed. There is also noted a paralysis of the left big toe. Otherwise no glands or metastases can be determined anywhere.

Case 2.—Mr. B., fifty-three years old, referred to me by Dr. Dorsey and Dr. Seidel, of Wichita, Kansas, for laryngectomy. The patient arrived in a state of such marked dyspnea that it was necessary to perform an immediate tracheotomy. His cancer, though marked, was confined entirely within the larynx, and if laryngectomy had been performed he might have been saved. The hurried tracheotomy under local infiltration anesthesia had such an effect on him that he

refused the laryngectomy, and returned home with his tracheotomy tube. Eight months later he returned, wishing to have the radium treatment tried on him. He now had esophageal obstruction so that not even fluids could be swallowed. There was also marked infiltration of the neck from the cancer; in other words, an inoperable carcinoma was present.

We now placed the 10 mgr. radium element as far back into the pharynx and as near the diseased tissue as possible. and the 5.5 mgr. radium element on the outside of the neck for crossfire action. This was allowed to remain for two hours at first. Following the first treatment a tremendous flow of saliva, two and a half pints in twenty-four hours, occurred. This same treatment was repeated daily for about one week, and outpouring of saliva was always greatest right after the treatment. In about two weeks he was unable to swallow anything at all, so that it was necessary to feed him by rectum. In accordance with my advice, a gastrostomy was performed under local anesthesia by Dr. C. Beck, with excellent results. When he recovered from this operation I made a tunnel on the side of the neck right into the greater tumor mass, for the implantation of the radium tube. I placed the 10 mgr. radium element into this tunnel and the 5.5 mgr. radium element on the opposite side for crossfire action. This was allowed to remain at first for two hours at a time, for one week. There was noted an improvement in swallowing as well as a diminution in the size of the tumor. I then decided to leave the radium in this tunnel all night, and there occurred a still greater improvement in swallowing and reduction in size of the tumor. But right here we noted what others have noted from too prolonged application of radium, namely, a rapid decline of the general strength of the patient. We learned from this case the positive effect of the radium on the size of the cancer, and the very deleterious effect of prolonged application of strong doses of radium. The patient's family, fearing that he might die in Chicago, decided to take him home, but up to the present time, six months since, he is still alive, although I understand sinking.

About one month later the patient developed marked brain (mental) symptoms and died from general asthenia.

Case 3.—Mr. W., fifty-two years of age, brought to the hospital with severe bleeding from the mouth, great difficulty

in swallowing, and marked swelling on the left side of the neck. Examination revealed laryngoesophageal carcinoma, with involvement of the base of the tongue and left inferior tonsillar region; in other words, an inoperable case. I decided to ligate the common carotid, the tumor on the neck preventing tying the external. While doing this I also excised this secondary tumor mass and preserved it under the strictest aseptic precaution, for the purpose of making of autolytic solution according to the method of Fichera. The bleeding stopped and the patient gained some in strength. The physician and patient both were desirous of trying the radium treatment, and this was done. In this instance we applied it for periods of two and three hours each day, to different points about the tumor, using only 10 mgr. of radium element. As in the second case, the same phenomena were observed as to the excessive flow of saliva, but not as to the rapid disappearance of the tumor; on the contrary, the tumor grew more rapidly, and after about six weeks I was compelled to perform tracheotomy. In due time (sixty days from the time the external secondary carcinoma was removed) the autolytic serum injections were given, but apparently with no success. The neck infiltration became so marked as to cause great edema of the tongue, so that the anterior portion became decubitic on resting on the teeth, and a portion of it sloughed away. In spite of all this, the patient is able to swallow liquids quite freely, and is keeping up his strength fairly well. Routine general examination failed to reveal any metastasis elsewhere in the body. From this case we have learned that the action of the radium has been negative as to the retardation or disappearance of the growth, and also that the use of the autolytic solution was not followed by its supposed result. Very little pain present, as in the other two cases.

Patient died about six weeks since the reading of this paper from general asthenia. There were no metastases to be found.

Case 4.—A man, fifty-six years old, who was referred to me with a diagnosis of tubercular laryngitis which would probably call for a tracheotomy, as he had considerable difficulty in breathing at times.

Upon examination I found that there was involvement of the larynx as well as of the base of the tongue and upper part of the esophagus. His sputum and general physical exam-

ination, including radiograph of the chest, show negative findings as to tuberculosis. Wassermann was also negative. By means of suspension laryngoscopy the original findings by indirect method were verified, and small pieces were removed for microscopic examination. These showed unmistakable evidences of a carcinoma. This being an inoperable case, radium treatment was begun. (November 4, 1913.) At first the 10 mgr. radium element was placed into the pharynx, as near the seat of the cancer as possible, and 5 mgr. radium element externally. The patient had so much difficulty in breathing while the radium tube was in his mouth, that that method had to be discontinued. We then placed the 10 mgr. of radium element externally on the right side of the neck, as near the cancer as possible, and the 5 mgr. radium element on the opposite side for crossfire action. The seances lasted for two hours. After one month of such daily treatments we discontinued the 5 mgr. radium element and applied the 10 mgr. of radium element externally on the right side, near the cancer, for three hour sittings. The patient had considerably more difficulty in swallowing than at first, and there was much tenderness and distinct evidence of a skin burn, but there were no evidences of glands or other metastasis distant from the growth. The patient lost about six pounds since he began treatment. The excess of the flow of saliva, as in the other cases, was very marked at first, but gradually it diminished so that the flow became about normal. Examination of the involved area, four months later, showed some edema of the soft palate on the right side and some spreading of the cancer locally. Not being encouraged by the progress, and being very homesick, the patient left for his home, resigned to his fate of succumbing to this disease. After about one week at his home the family discovered him dead, apparently during sleep.

The observations I made in this case were:

1. It was not necessary to perform a tracheotomy, which four months previous appeared almost indispensable.

2. As in the other cases, there was no formation of distant metastasis.

3. There was no pain, as is usually present in these cases. The excessive flow of saliva after each application of radium was present, but later ceased.

CONCLUSIONS.

1. None of these cases of carcinoma of the larynx ran the course that similar cases do without radium treatment.

2. Distinct destructive changes, even microscopically proven, of the cancer were observed.

3. Pain was practically absent.

4. The action of the radium differed in some of the cases, as in two the growths disappeared at least for a time, while in two it did not; in fact, the cancer grew.

5. The effect of the radium on the salivary apparatus was very distinct.

6. General symptoms similar to the cachexia, but still differing in some ways, could be seen whenever the radium was used for any prolonged period.

7. From the positive results obtained by the writer in some of the superficial carcinoma of the nose, mouth and palate, and from the good results of others who treat superficial cancers, it is the belief of the writer that much larger doses of radium element employed in the treatment of carcinoma of the larynx would possibly cure such conditions, especially if employed early.

REFERENCES.

1. Experiments With Radium in Some Nose, Throat and Ear Affections. Laryngoscope, December, 1904.

2. Further Observations on Some of the Newer Therapeutic Measures in Ear, Nose and Throat Affections. Annals of Otology, Rhinology and Laryngology, June, 1910.

3. Exner: Concerning the Retrograde Change of Carcinoma and Metastases and Other Action of Radium Rays. Wein. klin. Wochenschrift, 1904, No. 7, p. 181.

4. Chalupecky: Action of Mesothorium on the Eye. Wein. klin. Rundschau, 1913, No. 1.

5. Kronig and Gauss: Treatment of Cancer by Roentgen Rays and Mesothorium. Deutsche med. Wochenschr., 1913, No. 26, p. 1233.

6. Bumm: Concerning the Use of Roentgen Rays and Mesothorium in Carcinoma. Berl. med. Gesellsch., 7, v. 13.

XXII.

A SHORT STUDY IN THE ETIOLOGY OF NASAL HYDRORRHEA, WITH CASE REPORTS.*

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Hydrorrhea nasalis is one of the dark chapters of rhinology. It is a subject usually dismissed with a few words or a paragraph by the textbook writers. Parker says: "The etiology is very doubtful, but generally occurs in neurotic individuals, and is itself closely allied to paroxysmal rhinorrhea; indeed, it is often difficult to draw a sharp line of distinction between the two complaints." Phillips, in his book, published in 1911, is satisfied with this statement: "The exact nature of this affection is not well known, but probably several conditions, mostly neuroses, are causative factors." Gradle's textbook does not mention this phenomenon. Ballenger makes mention of it in a short chapter. Except Bosworth, who, in 1889, first called attention to this affection, and recorded eighteen cases (of these all but three are, in the light of our present knowledge, sinuses diseases), the English writers make little mention of it. The later German textbooks, notably Chiari and Zarniko, pay more attention to the subject.

Chiari, in his "Die Krankheiten der Nase" (1902), page 37, relates a case that appears to have been a cerebrospinal rhinorrhea and not a pure hydrorrhea nasi, the limits of which we will consider later.

Zarniko[1] goes into the subject more thoroughly than any of the textbook authors.

This question has, up to recent times, been merely a speculative one, and all authors agree that the disease is caused by a nervous disturbance causing, as Grayson says, a lack of balance between the arterial and venous circulations.

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*Read at joint meeting of Chicago Laryngological and Otological Society and Section on Oto-Laryngology of St. Louis Medical Society, at St. Louis, Nov. 29, 1913.

There are two types of this affection that present in part the same symptoms, but whose anatomic pathologic basis is entirely different. These are: (a) The cerebrospinal type, and (b) the nasal type.

In the former there is a definite anatomic loss of continuity in the skull, a hiatus is formed, through which the fluid pours into the nasal cavity. In the latter, pure nasal type, which may vary from the paroxysmal rhinitis to the almost painless, nonirritated variety, with only an abnormal volume of watery discharge from the mucous lining of the nose. Between these extremes lie the vast number of intermediate cases, all of which are due to some change in the mucous membrane.

On the examination of case records and searching the literature, one is struck by the fact that this is a disease of adult life or late youth. According to my experience, there has been a preponderance of females, although St. Clair Thompson thinks that males and females are affected alike.

Birkett[2] enumerates the following predisposing factors, viz.:

1. A neurotic temperament, implying susceptibility.
2. A local morbid condition of the nasal mucous membrane, which may or may not be associated with gross pathologic structures.
3. An irritant acting without or within.

Now, as to the active factors in the case. Following the lead of Bresgen,[3] who struck the first note of our modern conception of the pathology, that this disease is a sympathetic nerve affection, we must first consider the work of Max Buch,[4] who has shown by animal experiment that the sympathetic fibers are not sensitive in health, but if they are rendered hyperemic, or if the animal experimented on is teased or tormented, the fibers become very sensitive. Bidder and Volkmann[5] found that the nerves distributed to the mucous membrane of the nose contain five to twenty times as many more sympathetic fibers as the cerebrospinal, and that the preponderance of nerve fibers is most striking in the branches of the fifth nerve distributed to the nose.

The functions of the sympathetic fibers are vasomotor and secretory.[6] Therefore, reasoning from these premises, one is led to believe that hydrorrhea nasalis is a disturbance of the sympathetic nerve fibers in the nasal mucous membrane,

caused by some irritant or by nervous shock similar to a tormented animal, giving rise to a change in the function of the fibers and causing vasodilatation and extravasation of a watery fluid.

I wish now to bring two case histories to your notice, hoping at a future period to bring experimental evidence for your consideration.

Case 1.—G. M., female, aged eighteen years. Born in Roumania, came to America at the age of eight. Until her thirteenth year attended public school, when her father's growing business required help. The father being unable to read or write, the patient was sent to business college. The college work was difficult for her to master, and required study most of the day and well into the night. On completing the course she entered her father's office, and worked from 8 a. m. until about 10 p. m. It was during the early months of her business career, worried by the responsibilities of her position and reduced in strength by her hard college course, that the nasal attacks appeared. They are characterized by sneezing, discharge from the nose, swelling of the nose, redness of the eyes, and lacrimation, together with a severe headache. Occurrence varies from twice a week to once in three months, and they last about twenty-four hours. The attacks occasionally come on following a change in the weather, inhaling dust, or most frequently, some disturbance of mental state, worry, excitement, quarrel, etc.

The attacks are ushered in by sneezing, yawning and a subjective occlusion of the nose. This is followed by a thick yellowish discharge, which later becomes thin and watery. The nose now becomes hyperemic and swollen and smarts. Associated with the nasal phenomena the patient's eyes become red and a profuse lacrimation is observed. During the attacks photophobia becomes severe. Frontal headache is, as before stated, a constant symptom. These symptoms last twelve to twenty-four hours, when they gradually disappear. When the attacks occur at frequent intervals they are not as severe as those that come on after longer periods. During the interval between the attacks an examination of the nose and throat is absolutely negative.

Past History.—Has had pneumonia, diphtheria, scarlet fever, measles twice, mumps, operation for appendicitis at

the age of sixteen, and had tonsils removed at seventeen, in the hope that their removal would influence the nasal condition by removing a possible septic focus.

Inquiry as to the likes and dislikes for food, to rule out a metabolic disturbance, shows that her average diet consists of:

Breakfast: Tea with lemon; an orange or grape fruit; one soft-boiled egg, and white bread.

Dinner (Noon): Meat soup; chicken or meat; potatoes; canned fruit; Seltzer water.

Supper: Cheese; herring and bread.

Her temperature, pulse and respirations are normal—98.6° F., 88, and 24.

Blood: Hemoglobin (Sahli), 98 per cent; 5,072,000 reds; 11,800 whites (neutrophils, 70; small mononuclears, 28; large mononuclears, 1; eosinophils, 1).

Blood Pressure: Right, 107; left, 110.

Urine negative, even after 90 grams of glucose. Three specimens examined at two-hour intervals. Glucose given at 6 p. m., and urine examined at 6, 8 and 10 a. m. The same result and same intervals after 90 grams of levulose.

Gastric contents after Ewald test meal—on analysis of 100 cc., which was grayish brown, 0.2 per cent free acid, and 41 per cent acidity, with 0 organic; otherwise negative.

Feces: Acid, dark brown, solid. No mucus or pus. Blood, none microscopically; chemically, trace. Food: Occasional epithelial cell and muscle debris.

Case 2.—C. F., aged twenty-six years, female. The death of the father in May, 1911, caused a change in the mode of life of the family; from ease and comparative luxury, they were thrown upon their own resources, the brunt of it all falling on this girl. Six weeks following this great sorrow, and during a time of great stress, the patient developed what she thought was coryza, but which has continued with a slight intermission since the onset, in 1911. The illness is characterized by a sense of occlusion of the nose and a discharge that is usually thin and watery, but sometimes thick and yellow. On arising in the morning the patient sneezes ten to twelve times, and this phenomenon also occurs when the patient is subjected to excitement. Anosmia is present. The menstrual period is accompanied by increased severity of the symptoms.

Objectively, the turbinates on both sides are pale pink, very

much swollen, and more sensitive to the touch than normal. The nose seems filled with a thin mucoid fluid that apparently exudes from all the structures in the cavity. Cocainization and adrenalization reduces the turbinal swelling to nearly normal, leaving no pendulous hypertrophic areas.

Stein's injection of alcohol, cauterization of the tuberculum septi, washing the antra of Highmore gave negative results. Small doses of saturated solution of potassium iodid, as advised by Pierce, also gave no results. Physical and neurologic examinations negative.

The patient sleeps well and is given to outdoor sports. According to her own statement, she says: "I am not of a nervous temperament, not irritable, not easily annoyed, nor given to worrying over little things."

Now, the point of this whole discussion and the cases I have recited are cited in proof of the statement that there is a distinct nervous element in these cases. In the first, the girl was tormented by her work and the realization of her immense responsibility. In the second case the rhinorrhea followed in a short time after the death of a remaining parent, throwing on an erstwhile care-free girl the support and responsibility of a family. One case resulted in a rhinitis vasomotoria, and the second in rhinitis edematosa, both of the same class, but of different variety.

I wish, in conclusion, to assert that instead of saying there may be, to say that there is a nervous element in these cases, and that in all probability this unpleasant disease is caused by a change in the reaction of the sympathetic fibers distributed to the nasal mucous membrane of the nose.

REFERENCES.

1. Die Krankheiten der Nase und des Nasenrachens, 1910, p. 593.
2. British Medical Journal, 1910, ii, 1708.
3. Nasenleiden und Sympatheticus: Beitr. z. Anat., Physiol., Pathol. u. Therap. d. Ohres, der Nase und des Halses, iii, 125.
4. Die Sensibilitätsverhältnisse des Sympathicus und Vagus mit besonderer Berücksichtigung ihrer Schmerzempfindlichkeit im Bereich der Bauchhöle. Arch. f. Physiologie, 1901, pp. 197-221; St. Petersburg Med. Wchnschr., 1901, N. F. xviii, 131 and 141.
5. Die Selbstständigkeit des sympathischen Nervensystems durch anatomische Untersuchungen nachgewiesen, Leipzig, 1842.
6. Zarniko: Die Krankheiten der Nase und des Nasenrachens, 1910, p. 34.
7. Aschenbrand über den Einfluss bei Nerven auf der Secretion der Nasenschleimhaut, M. F. O., 1885, p. 72.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of October 2, 1913.

Paper: Concomitant Association of Otitis With Other Diseases.

By Felix Cohn, M. D.

DISCUSSION.

Dr. Isaac Adler expressed his personal gratitude to Dr. Cohn for his able paper, as it contained a vast mass of important diagnostic and clinical material of the utmost value to all physicians—general practitioners as well as otologists. These various forms of concomitant disease are often encountered and are apt to lead to a wrong diagnosis. In speaking before the otologists he felt something like "Saul among the prophets," but would nevertheless like to say a few words regarding a mild form of otitis which frequently occurs concomitantly with rheumatism, which Dr. Cohn had not spoken of. It is a rather harmless form—though some specialists might object to that term—and usually precedes general rheumatic affections. It is accompanied by a serous exudate in the middle ear, which sooner or later becomes absorbed. There is often a peculiar sensitiveness about the mastoid, sometimes associated with swelling, and he knew of a number of cases in which this rheumatic otitis had been treated as suppurative mastoiditis and operated upon, not to the advantage of the patient. It is well worth while to study this form. It usually occurs before the general rheumatism appears, but also after the polyarthritis or the muscular rheumatism has set in, and it gradually disappears. A number of cases had come under his observation, in which the rheumatism appeared first and the otitis later on, had remained for quite a long time, the mastoid and its surroundings being somewhat

swollen and tender to the touch for months after the rheumatic conditions had passed away. These conditions might be termed rheumatic osteitis. That they are based upon rheumatism is clear. As a rule they are not serious or dangerous, and get well of themselves. Antirheumatic medication does some good.

DR. WM. SOHIER BRYANT said that the concomitance of otitis with other diseases is so usual that it may, in a way, be compared with the concomitance of fire and smoke. Fire and smoke rarely occur separately; no more do otitis and other diseases. This general concomitance of otitis with other diseases is due to the physiologic location of the ear and to its anatomic connections.

Physiologically, the ear is situated at the opening of the respiratory tract and at the upper end of the digestive tract, with both of which it is connected by the pharyngeal tube. Therefore, whatever inflammatory disease affects the digestive or respiratory tracts must, of necessity, cause corresponding changes in the ear. Pharyngitis or pneumonia, tonsillitis or typhoid fever, have their bearing on the ear and betray themselves by a catarrhal otitis media, a purulent otitis media, otitis interna, or an auditory neuritis. The truth of the reverse of this observation—that the otitis causes diseases of the respiratory and degistive tracts—is exemplified in the fact that often pharyngitis, bronchopneumonia, gastric and duodenal ulcer, or appendicitis follow purulent otitis media.

Anatomically, the ear is located between the nasopharyngeal and the cranial cavities, and is connected with both. By extension, diseases of these regions easily reach the ear. There are three ways in which this occurs: (1) By direct extension and aspiration; (2) by the blood vessels and lymph channels; (3) by the nerves.

1. Diseases of organs situated near the ear cause otitis by direct extension or aspiration. For example, adenitis of lymphatic and salivary glands, erysipelatous dermatitis of the face, sinusitis of the nose, pharyngitis, tonsillitis, and many more diseases, cause otitis by direct extension of inflammation to the ear.

2. The blood vessels and lymphatics of the ear carry bacteria and toxic substances from diseased organs to the ear, causing otitis. Observe otitis with the exanthemata, pharyn-

gitis, tonsillitis, hypothyroidism, syphilis, epidemic parotiditis, and nasal sinusitis.

3. Otitis may occur through diseases of the auditory and facial nerves, and through diseases of the tympanic plexus of nerves which connects the ear with the cranium, autonomic and sympathetic nerves comprising the geniculate, Gasserian, ciliary, sphenopalatine, otic, petrous, and submaxillary ganglia, and the ganglion of the root, together with the third, fourth, fifth, seventh, eighth, ninth and tenth cranial nerves, and the second and third cervical nerves. Note—herpes zoster and trophic disturbance of the ear.

All general pathologic states and diseases can produce inflammatory changes in the ear. The reverse is equally true and obvious—otitis causes other diseases: (1) By direct extension through the neck and throat; and by aspiration, otitis produces meningitis, brain abscess, venous thrombosis, pharyngeal abscess, cervical cellulitis, mediastinal cellulitis, lymphadenitis, erysipelas, pharyngitis, gastric and duodenal ulcer, appendicitis, and bronchopneumonia. (2) Through the blood and lymphatic vessels otitis produces disease by thrombosis and emboli to the brain and system generally. Otitis also produces pneumonia, pleurisy, sinusitis, metastatic abscesses, nephritis, bacteremia, and toxemia, and many other diseases and conditions. (3) Otitis causes nerve reflex disturbances, cough, epilepsy, neurasthenia, myasthenia, defective equilibration, psychoses, and psychesthenias.

Otitis affects the general system through toxic products and metastases, causing inflammations. It also affects the general system through nervous exhaustion, causing psychopathies and neuroses; and neurasthenias of the autonomic and sympathetic nervous systems, which in their turn produce abnormal secretions of the ductless glands—thyroid, pancreas, pituitary, suprarenal, and others.

Keep your eye on the ear in diseases of other organs and your eye on the other organs in diseases of the ear. The specialist on the ear should be keen to discover any defect in other organs and have their defects corrected for the benefit of the ear; also specialists on diseases of other organs than the ear should be keen to discover any malign effects of these other diseases upon the ear, and should be prompt in mitigating the damage to the ear.

Dr. Felix Cohn thanked the gentlemen for their participation in the discussion. He could only endorse Dr. Adler's remarks in regard to the relation of otitis to rheumatic conditions. The otitis occurring with rheumatic affections also belongs to the protopathic type, and there are cases on record in which, as in some other infectious diseases, the early manifestation had preceded the rheumatic attack by several days. These forms of early otitis occur with almost all infectious diseases.

In regard to the remarks of Dr. Bryant, while he agreed entirely with Dr. Bryant's views, the subject of the paper was not the various conditions under which we may have a middle ear inflammation, but on the concomitant association of otitis with other diseases. The otitis referred to by Dr. Bryant is really the socalled genuine otitis, in which doubtless the infection is caused by contiguity. In the cases of concomitant otitis, we can almost practically exclude this causation. This subject is of especial interest because we are now even able to occasionally separate the secondary forms of otitis from the cases of concomitant otitis, even if the otitis is produced by similar organisms. The agglutinative action of the pneumococcus obtained from the middle ear on the serum of the patient in cases of pneumococcus otitis due to a general pneumococcus infection, as opposed to the absence of agglutination in secondary genuine forms of pneumococcus otitis, is sufficient proof that these forms of otitis, though apparently induced by the same organism, cannot be considered identical.

With reference to the inquiry of Dr. Polk in regard to the association of otitis with typhoid, we find similar conditions as in other infectious diseases. In the protopathic forms of otitis we find the exudate usually either sterile or containing the specific organisms in those infectious in which specific organisms are present. In typhoid we therefore find either a sterile exudate or the typhoid bacillus, and there are cases on record where a pure culture has been found even in the fourth week of the typhoid. While the exudate may be sterile at first, we, of course, very soon find other organisms present, which invade the middle ear either by contiguity through the tube or from the external ear.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of November 14, 1913.

Paper: Contre-Coup Fracture of Skull.*

By Talbot R. Chambers, M. D.

Probable Injury to Jugular Bulb Following Myringotomy in Infant Ten Months of Age.†

By John Randolph Page, M. D.

DISCUSSION.

Dr. Duel said that the point made by Dr. Page in regard to the possibility of injury to the bulb by myringotomy was very well taken, and recalled an instance which had occurred the year before in which the bulb was undoubtedly injured during a myringotomy performed by a pediatrist who does this operation very frequently. There was no subsequent infection of the bulb, however, although a packing was required for some days in order to control the hemorrhage.

Dr. Jarecky told of a case admitted to the Sydenham Hospital three years ago on account of profuse hemorrhage from the ear. This patient had an otitis media, for which the family physician had incised the tympanic membrane. The temperature was not high when admitted, about 102°; that soon subsided somewhat, but the bleeding continued. An injection of horse serum, 20 cc., was given, the temperature dropped to normal, the hemorrhage ceased, and the membrane became normal in a short time. Undoubtedly the jugular bulb had been incised.

Dr. Seymour Oppenheimer said that the knowledge that a myringotomy is not such a simple thing ought to be more generally disseminated. It was quite certain that if we could get reports from all the men who are doing myringotomies we would learn that many accidents are occurring, resulting in subsequent impairment of the hearing function. He has seen three cases in which there was an ossicular dislocation

*See page 164. †See page 161.

on account of an improperly placed incision in the drum membrane. The pediatrists are the chief offenders in this respect, and if the facts in regard to this subject were more generally disseminated among them, much would be accomplished toward the elevation of the science of otology, and myringotomy would not be regarded as a simple stab.

Paper: The Epipharynx in Childhood in Its Otologic Aspect.*

By Edgar M. Holmes, M. D.

(by invitation.)

DISCUSSION.

Dr. Myles expressed the thanks of the section to Dr. Holmes for his valuable rounding up of the subject. Most surgeons are pleased with the gross results obtained in this field of work, but very few of those who follow up the operative procedure are satisfied with the net results. For some time past he himself has made diagrammatic sketches of this region, measuring through the oropharynx and through the nose. He had noted considerable adhesive tissue in Rosenmüller's fossæ after operations by those who used large curettes, probably from the taking out of too much of the mucosa and not limiting the operation to the adenoid tissue per se. The more nearly the operation is confined to the adenoid tissue and the less the mucosa is injured, the better the result. So far his best results in cleaning out these fossæ have been obtained with the index finger.

The technic developed by Dr. Holmes and the masterly way in which he manipulates the instruments, and the almost superhuman way he has of preventing tuborhinopharyngeal adhesions from developing are remarkable. The important point, however, is to ascertain how much the overcuretting or overremoval of the mucosa of the deeper parts lying around the rhinopharynx or epipharynx is attended by evil results. It is in this way that the technic should be improved; in other words, only so much of the tissue as is absolutely necessary should be removed, and no more.

Dr. Yankauer said that he was much pleased to hear Dr. Holmes strike the conservative note in regard to adenoids.

*See page 138.

Within the last six months he himself had had occasion to refuse operation to at least four cases in private practice, and of course the number of cases that are constantly referred to the clinics from the schools, in which operation is refused, is very much greater. The manner of dealing with this question in New York is perhaps slightly different from that pursued in Boston. The children sent to the clinics in New York are not sent for operation, but for diagnosis and appropriate treatment.

Dr. Yankauer said that he was thoroughly in accord with Dr. Holmes' remarks in regard to the importance of examining the rhinopharynx some time after operation in order to note the end results. In the examinations which he himself has made—some with Dr. Holmes' speculum and some with the direct speculum—he has occasionally found it necessary to sever an adhesion, and this has been easier to do with the direct speculum than with Dr. Holmes' instrument. In children two or three years of age and older it is possible to use the same direct speculum as in adenoids. It is Dr. Yankauer's custom, after the operation, to introduce the speculum, and by keeping the field clear with the suction apparatus, there is very little difficulty in determining the thoroughness and efficiency of the operation, and removing any shreds of tissue that may remain in the nasopharynx. In very young children or in infants, however, the instrument has proved too large.

He has had occasion to inspect the nasopharynx of such children as have been troubled with continuing ear symptoms, and has used various sizes of the direct speculum, and has found that one of the smaller sizes was the most useful in young infants. It has an opening of about one-quarter that of an adult speculum.

The removal of the adhesions between the eustachian tube and the posterior pharyngeal wall is of very great significance, and does not seem to be generally recognized. This importance consists not only in limiting the movement of the tube—the interior wall takes more part in the motion than the posterior wall—but in the interference of these adhesions with the drainage. If one will only think it over, he can readily see that there was a reason for the eustachian tube being built just as it is—because the nose is filled with infectious

germs in most persons, and the tube forms a wall around the hole which leads to the ear and prevents the secretion from the nose getting into the ear. When the patients lie down, the secretions flow above the eustachian tube, into the fossa of Rosenmüller and down into the pharynx. The function of the eustachian cushion is to prevent the secretions of the nose, which are necessarily infectious, as the nose is the filter which filters the germs from the air, from getting into the ear. If the adhesions are there, the gutter is blocked up, and the secretion flows over the cushion and gets into the tube.

Dr. Yankauer said that he had formerly used the old method of removing these adhesions, namely, breaking them down with the finger; but that as he had had them recur and had to break them down again, he had found that by punching them out they are less liable to return. This punching out is followed by applications of nitrate of silver until the wound is healed. It is very easy to get behind the cushion and lift it forward, and by inspection treat the granulations that form and so prevent the recurrence of adhesions.

Dr. Holmes had mentioned a method of treating the early stage of acute otitis in children. Dr. Yankauer said that he had been especially interested in this, for he had been doing the same thing for a long time. Two or three years ago he had published a paper on the eustachian tube, in which he had mentioned the use of cocain and adrenalin followed by argyrol in the acute stages, and had also said that it was sometimes possible to abort acute otitis media. His subsequent experience, however, had shown that when there is already pus in the middle ear, even if the pain can be relieved by cocainizing the tube, the suppuration will continue, and sometimes two or three days later there will be a spontaneous rupture. In the very early stages of otitis, however, before suppuration is established in the middle ear, it is possible to abort an otitis by cocain and adrenalin. He had not tried to do this with young children with the direct speculum, but had found it just as practicable to put the child flat on its back, with the head turned to the diseased side, and then drop the cocain and adrenalin into the nose, being careful that it reaches the floor of the nose, preferably under the turbinate; for this reason he uses a curved dropper. Very often within a few minutes the pain is relieved and the child goes to sleep. Dr.

Yankauer said that the section was indebted to Dr. Holmes for presenting this subject in such a vivid and interesting manner.

Dr. Duel said that Dr. Myles had "hit the nail on the head" when he said that the gross results in this field of work were satisfactory, but that the net results were very unsatisfactory. There is no question that in the majority of the patients who present themselves at the clinics and in private offices it should be determined with great ease whether or not they have a condition demanding operation, without a very rigid examination—the history of the child, the question of breathing, etc., the usual history that comes with such cases, is sufficient to save any experienced surgeon from the chagrin of being put down by future generations as having been either too radical or too careless. He was convinced, however, that a small minority require more care and judgment in regard to whether or not they should be operated, and should frequently be kept under prophylactic measures for a longer period before it was.

As he observes operators nowadays, it seems to him that less rough methods are being employed than formerly. The curette is used less than formerly, and most operators are using some form of instrument by which the danger of stripping the mucous membrane down the posterior wall of the pharynx is lessened, and when the curette is used it is employed to remove only a small portion of tissue just in the region of the vomer.

One of the important points to which Dr. Holmes had directed attention was the question of moisture in the atmosphere for children suffering with nasopharyngeal obstruction. There is no doubt that many questionable cases would clear up if the proper hygiene of the nasopharynx were maintained and the children were kept in the open air or in properly moistened atmosphere. If we should examine the hygroscopic condition in most of the rooms in New York it would be found that it is altogether too low, and every one would be more comfortable if there were more moisture in the air.

A very interesting experiment has been carried on at the Babies' Hospital, which has considerable significance in regard to the infection of the middle ear by the route of the nasopharynx. At Dr. Holt's suggestion, Dr. Duel and Dr.

Chappell had discussed the possibility of cutting down the number of cases developing middle ear conditions after having been admitted with catarrhal conditions of the nose. It was suggested that half of a ward of patients suffering under similar conditions be subjected to a certain hygiene of the nasopharynx, while the other half were let alone. It was significant that of the large number of patients under observation, in the course of a year 50 per cent less of those who were subjected to the rigid routine of clearing out the nasopharynx developed middle ear conditions, as compared with those with whom nothing had been done.

We cannot lay too much stress on the importance of prophylactic measures in cases of simple catarrhal conditions, or in cases where there is pharyngeal obstruction. Dr. Duel said that personally he had questioned the value of the method proposed, and was very glad to record himself now as having gone through with the experiment and as having been wrong. The method proposed was the use of the postnasal douche, containing a 25 per cent argyrol solution. His contention had been that the employment of the postnasal douche might result in forcing infection into the ear, and that this danger might be avoided by simply dropping the solution into the nose; but Dr. Chappell contended that by employing the method which he has always used successfully (by pulling the soft palate forward with the curve of the instrument before the fluid was shot out), he found that there was absolutely no danger. Dr. Duel said that he had contended that while Dr. Chappell himself might do this successfully, it would not be properly done in the routine of the hospital. Then Dr. Chappell agreed to instruct the house surgeons in the method, and they soon became expert and did it very well, with the favorable results reported.

Dr. Willliam C. Braislin said that some years ago he had had an opportunity of examining the nasopharynx of fifteen newborn children (still born), and in all, with one exception, there was a well marked pad of lymphoid tissue which with an instrument could have been attacked and a good deal removed. In the one case in which this was absent, the child was obviously diseased, and would not have survived in any event. It had greatly surprised him to find this condition; but to have made this series of examinations and to have

found such a considerable mass of adenoids present at birth proved to him a need of this tissue and that it has a physiologic function. Personally he believes that its function is to moisten and warm the air; of which physiologic function these young children get so little from the nose, which is so small. Its width is small, and anteroposteriorly it is also small, as are also all the bones which make up the nose and face; while, on the other hand, the infantile pharynx is comparatively of greater superficial extent than in the adult.

The matter of using the douche, of which Dr. Duel has spoken, is interesting. The use of the douche, particularly in children, and even more especially in very young children, seems to him rather harmless, however used—that is, when a nonirritating fluid is employed. The doctor said he felt quite free to recommend douches in the many cases in which he thought it needful, with the proviso that for a few minutes subsequently the nose should not be blown at all, and that an interval of time, sufficient for the fluid to drain away from the mouth of the tube, should elapse before an attempt is made to blow the fluid from the nose.

Dr. Jarecky said that the subject is full of interest. The school inspectors send patients to the clinics requiring adenoid operations simply because the children are mouth breathers. They do not recognize whether the children have adenoids, but they are mouth breathers; and so with the general practitioners—when they came across a mouth breather, they require an adenoid operation; they do not stop to consider whether or not the children have had syphilis, or suffer from some bony obstruction in the nasopharynx, etc., but they want the children operated, and when that is attempted, the results are unsuccessful in relieving the child. That must be, for the condition does not demand it.

He had used the instrument which Dr. Holmes recommended. Recently he had seen a boy fourteen years old who came from Pennsylvania troubled with defective hearing. His adenoids had been removed, but the hearing was not improved. In this case the adhesions present around the eustachian tube were so easily relieved by the use of Dr. Holmes' instrument that the patient was quite delighted with the resulting increase in hearing. He had been using argyrol for fully three years in these cases of nasal obstruction and

congestion of the soft tissue, with good results. Not only in the nose and throat cases, but also where some inflamed condition with discharge from the nose and irritation of the eyes is present. If it is used in the eyes and the lacrimal duct is patent, it will go down to the nose and the result is very satisfactory.

Dr. Cocks said that one point had not been spoken of. If all the operators would use a general anesthetic, especially with children, there would not be so many cases of injury to the nasopharynx, soft palate and other structures in the throat. There are still many clinics in the city where adenoid and tonsil operations are being done without any anesthetic at all. This is not only cruel, but is also unscientific, and the surgeon who operates in that way takes many undue risks. The time has come to demand a halt in such procedures.

Dr. Heller said that Dr. Holmes had not referred to the shape of the vault. As every one knows, the vault is formed by the under surface of the body of the sphenoid and by the anterior surface of the atlas and axis. He had been surprised to observe that often where the obstruction seemed the greatest there was often very little adenoid tissue; and in other cases, where the children did not complain of mouth breathing, there was quite a little. Then he discovered the difference lay in the shape of the vault, and tried by digital examination to determine beforehand what that shape was in each case. He had not been very successful, as these cases of adenoids occur in very little children, and if there is any adenoid tissue the vault is pretty well filled up. Then we do not always use the right curette. The shape of the curette has a great deal to do with the success of the operation. If there is a big hollowed-out vault and we use a shallow curved curette, we do not get far enough back, and do not get it all out. In other cases we get out too much. If there is a shallow vault, there is opportunity for more adhesions; or perhaps a little granulation tissue takes up this narrow space, and the child comes in some time later with the return of mouth breathing. The doctor said that he was trying to examine these little patients after operation carefully, although it was not always easy; the mothers sometimes object, and the children always do. It seemed certain that the shape of the vault had a great deal to do with the results obtained.

Another important point is that of medication in the nose. Every running nose ought to be treated, and physicians and parents should understand that such a condition is very far from normal, with or without otitis media. In such cases he has been using menthol one-half per cent and iodin one-fourth per cent in albolene. It irritates the nose and makes the children sneeze, and they sneeze out a great deal of the mucus which otherwise would stay in the nose. Such a remedy should be put into the nose two or three times a day, in the Rose position. The children object, and the parents think it very cruel, but the results justified him in the belief that it is very beneficial.

Dr. Lederman said that one or two facts struck him as being very pertinent, especially what Dr. Braislin had said about the conditions in newborn children. We have gone ahead without giving the subject of physiology proper attention, and if Dr. Braislin was able to observe that mass of glandular tissue in the newborn, it certainly had a meaning. We are probably operating too early on these cases; it is important that they should be carefully observed and treated before operating. We all know of cases in which masses of adenoids have been removed, and have recurred. That does not happen because it was removed, but for some physiologic reason, and this question should receive more attention. There are a number of children of this type for whom hygienic treatment will do much, and they will probably be more benefited by local treatment than by going on to operation, which may leave the rhinopharynx dry, and lead to injury of the organ of hearing.

Another point is the operation on these children in a state of acute infection. We know that there are some of our confreres who will operate during an acute tonsillitis or acute otitis, and take out tonsils and adenoid tissue, and perhaps expose the children to serious consequences.

A third point is the treatment of this condition (acute otitis) locally, and also the rhinopharynx as part of the ailment. A good many years ago he had adopted the argyrol treatment of the nose and rhinopharynx, and many of these cases are much benefited and are cured in quicker time by these topical applications if made by the physician, and not by the patients, who cannot do it properly.

Dr. Wilson said that the section was much indebted to Dr. Holmes for coming over from Boston and stirring them up on this subject. Two or three years ago he had himself read a paper, before the laryngological section, on the removal of tonsils and adenoids, in which he had claimed that we were operating on too many of these cases. He had asked some friends in New York why they were doing so much operating, and they informed him that it was because the school inspector had sent the children to the clinics and would not allow them to return to school until some operation had been done. We are all aware of the fact that young children have adenoids. Every child has adenoids, and because it has a ring of lymphoid tissue in the epipharynx is no reason for its removal. If this tissue becomes very large, it may become necessary to remove it, but it is certain that many of these cases can be reduced by hygienic means and local treatment, without resorting to operation.

Dr. Seymour Oppenheimer said that he had recently read of two deaths following the introduction of menthol into the nose of young children, and this should be borne in mind, as it might be attended with very disastrous consequences. He had recently had the pleasure of seeing some of Dr. Holmes' work in Boston, and had been delighted with the great skill which the doctor showed in treating the nasopharynx, eustachian tubes and accessory nasal cavities under the guidance of the pharyngoscope. One could not realize, until he made a trial himself, how much skill and patience Dr. Holmes had exercised to bring himself up to the stage of proficiency which he had attained.

Dr. Holmes, in closing the discussion, expressed himself as highly gratified at the manner in which the members of the section had elaborated upon his paper, they having brought out many points which he could not well treat of in a paper of limited extent. He was going home very happy, for while he knew that he would be treated as a gentleman, he feared that he would meet with a rather warm reception for being so conservative. He realized that too much care is not necessarily conservatism; but while he did not fear that we would be too conservative, he believed that in the future we would be more careful than we have been in the past in regard to the removal of growths in the epipharynx, especially bands

in the lateral fossa. Every one works up a certain technic and becomes proficient in it, and for a number of years he had removed the bands with his finger, but he had more adhesions recur in that class of cases than since he has adopted the plan of removing them with a sharp curette or forceps under the guidance of vision. In using these instruments, however, one must observe great care not to cut over toward the cushion of the tube.

With regard to the epipharynx in children, he had not tried to take up the anatomy in this paper. Of course that has been studied in very young children. They all have quite an amount of adenoid growth, but they have not a large sphenoid prominence. They can have quite a large amount without affecting the eustachian tube. It is perhaps greater than in more advanced life. In development the face grows downward, and the upper part does not change so much. The upper wall is narrower and lower than the floor of the epipharynx or the roof of the soft palate.

Dr. Holmes expressed his gratitude to Dr. Duel for bringing out the question of the douche. He felt that perhaps he had been too careful, and possibly the bad results that he had seen were due to faulty technic in using the douche, so that he had become overalarmed in regard to it. It was, therefore, possible that the statement he had made in this respect was incorrect.

He had not touched upon the subject of the chronic disease of the tube, for, as a rule, that had reference to much older people. In young children the tube, unless there is some congenital deformity or acute severe infection, will usually take care of itself, after the nose and the epipharynx have been cared for. In the manner of the treatment of the tube, he had not changed very much from the technic and methods which he had published during the last two years. In those cases where there are obstructions in the tube that do not subside after the epipharyngeal end has been cared for, the slow bougieing with the cotton tipped bougie has given better results than those obtained in any other way. One must be careful in the force used; if the dilatation is done rapidly, it will almost always result in failure. If the eustachian tube is treated by careful and progressive bougieing, as is the urethra, we will be gratified with the results.

In regard to Dr. Yankauer's cases of purulent secretion within the ear, Dr. Holmes said he would agree that in all cases where there is mastoid extension with secretion, if the bulging is not reduced and there is still a tense bulging after the pain is relieved, he would not say "do not perform a myringotomy," for there will likely follow rupture of the membrane; yet during his last service in the dispensary treatment of the tubes was carried out upon all of the acute cases and in a number of them where there was pus, the bulging almost always subsided after a short time. Out of some fifty-odd cases, there were only two in which a paracentesis was performed. How many of them were purulent he could not say, for he had not treated all of them personally. The main thing seems to be not to forget that one function of the eustachian tube, which is possibly as important as that of ventilating the ear, is to act as a drain of that cavity. The aural mucous membrane, as do other mucous membranes, secretes more or less. It is probable that a small amount of this secretion is reabsorbed; as a rule, the excretions from the mucous membranes are almost always carried off. The eustachian tube is the natural outlet from the middle ear; it is anatomically supplied with cilia. While one function is to drain a deep seated cavity, any infection, whether purulent or not, that is sufficient to close the eustachian tube, is sufficient to disturb the processes of nature. If the eustachian tube is closed, the drainage is cut off, and there is no method of relieving the pressure in the ear, and the bulging of the drum membrane results. The minute that takes place and the secretion continues, there is pressure on all of the veins and capillaries, and more blood is carried into this inflamed area. This is nature's way in caring for an acute inflammation, and in almost every other place it is successful; but here we have a cavity nearly enclosed by a bony wall, the only yielding portion being the membrane and the eustachian tube. If we can relieve the tube and reestablish drainage, we give nature a chance to combat the disease. The pressure is reduced, the bulging of the membrane subsides, and the symptoms are relieved. We can drain the tube and restore the normal pressure of the middle ear, temporarily at least, in a large percentage of the cases of middle ear inflammation.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY AND SECTION ON OTOLARYNGOLOGY, ST. LOUIS MEDICAL SOCIETY.

JOINT SESSION, NOVEMBER 29, 1914.

Paper: The Semicircular Canals and the Function of Equilibrium.*

BY GEORGE E. SHAMBAUGH, M. D.

DISCUSSION.

DR. J. GORDON WILSON: There have been from time to time several explanations of the modus operandi of the influence which the internal ear exercises on muscle movement, and which Ewald called labyrinthine tonus. Ewald's idea was that the hairs of the maculæ and cristæ are always active and keep the endolymph in movement; further, that a movement of the endolymph produced by some other power which would increase or retard the activity of these cilia, would influence muscle tonus. This hypothesis, as Dr. Shambaugh has said, offers very serious objections. The hypothesis which Dr. Shambaugh advances, he has so briefly stated that one must have more details before coming to any definite opinion.

It is well known that the labyrinth is only one variety of organ which regulates muscle tonus. It constitutes a specially modified variety which presides over the head segment. We note then that Dr. Shambaugh's hypothesis is applicable to this special and very important type, and is not generally applicable to tonus organs. We are all agreed that the stimulation of the endings of the vestibular nerve probably comes through the hair cells. We are also agreed that currents of endolymph in canals of such minute size are inconceivable, and that we have probably to do with mass movements. This was Crum Brown's and Mach's original idea, and now is universally accepted.

Two obvious objections present themselves to Dr. Shambaugh's hypothesis. First, so far we have no anatomic proof

*See page 111.

that the hairs differ in the two sides of this crista in any way whatever. Further, would we not have to reverse the hypothetic strain in the various canals to bring it into line with the physiologic phenomena, since the maximum current in the horizontal differs in direction from maximum currents in the superior. Again, the explanation offered can only apply to animals with a canalicular system, and cannot be universally true of organs of equilibrium situated in the head segment. Thus, the squid has a well organized equilibrium organ called the labyrinth in the head segment, with three crista which lie in the three dimensions of space, but within one sac. Here it is obvious Dr. Shambaugh's hypothesis is not adequate to explain the phenomena of tonus movement.

Dr. Shambaugh desires to bring cerebellar tonus into direct association with labyrinthine tonus. I am not quite clear how dependent on each other he would make them. To my mind, cerebellar tonus is essentially different. In the cerebellum we have the grouping of the lines of communication from the peripheral tonus organs; a lesion of the cerebellum disturbs the lines of communication. In the labyrinth we have a peripheral tonus organ. As Dr. Shambaugh has pointed out, labyrinth action is well marked on the eye muscles. Here certainly the labyrinth reaction is distinct and independent of cerebellar influence. It is true, both influence the eyes and produce movements; but these are not alike, and, as I have shown elsewhere, are independent of each other.

There are a number of gaps in the description which, had Dr. Shambaugh time, without doubt, he would have filled. To discuss the subject fully, one would require the full text to see how these gaps are to be filled in. There is at present no hypothesis which commands general approval, and the full text of Dr. Shambaugh's paper will be awaited with interest.

DR. D. S. BOOTH: I would like to ask the question—i. e., is this a recognized fact among the otolaryngologists?—because I think the neurologist's explanation is that tonus is maintained by the cerebellum. I think that is the teaching of all the works on nervous diseases I have read, and this one is a new explanation to me, and I would like to know if it is definitely known and generally accepted.

DR. SHAMBAUGH, in closing: There are a great many questions in connection with labyrinth tonus that have not been

touched upon in the discussion presented this evening. It is important that one should have a satisfactory hypothesis to explain the clinical phenomena resulting from a disturbance of labyrinth tonus. It is not at all satisfactory to attempt to apply the rule of thumb in connection with these symptoms. A great variety of pathologic conditions, both in the labyrinth and intracranially, may arise and disturb the normal tonus. A very important factor in preserving equilibrium is the extralabyrinth tonus which arises from afferent impulses other than those from the labyrinth. This I have not touched upon at all in my paper.

The question has been asked whether otologists are agreed that disturbances of equilibrium are dependent upon pathologic conditions in the labyrinth. The interrogator seems to be under the impression that the accepted idea is that the cerebellum presides over this function. In reply I would state simply that I do not believe there is any difference of opinion, either among otologists or physiologists, regarding the important role taken by the vestibular apparatus in preserving the equilibrium of the body. Of course, any intracranial disturbance of the tract of the vestibular nerve produces the same sort of disturbance of equilibrium as that which arises from alteration in the end organ of the labyrinth.

Paper: Syphilis of the Ear.*

By Otto J. Stein, M. D.

DISCUSSION.

Dr. Beck: There is one point in particular in this paper that I would like to emphasize, and that is the condition of syphilis in the tube. One cannot too strongly keep that in mind in conditions of deep ulcers of the pharynx which occur in the later stages of syphilis. One should not allow the tube to close during the healing process, and the practical method to prevent obliteration is to pass graduated eustachian bougies. I have had such cases to deal with, and I believe that by this method of bougie dilatation complete obliteration of the tube was prevented.

Another point of interest to me was the pathology of the

*See page 116.

mastoid. I have had several cases in point. One in particular comes to my mind at present. A young woman, who had had four mastoid operations, came to me and I operated, but the suppuration still continued. I had saved several bone chips from the operated mastoid, and a microscopic examination revealed the characteristics of syphilitic ostitis, such as are found anywhere in the body in syphilitic bone disease, except as modified by the anatomic characteristics of the mastoid. The patient recovered after having been treated by antiluetic measures.

The point to which I thought the doctor intended to limit his paper is the use of salvarsan and the deafness following its employment. It is well understood, as the doctor brought out, that there is a swelling around the nerves following the injection, due to a liberation of syphilotoxins, which bring about a temporary edema known as Herxheimer's reaction. We also know that other drugs, mercury, for instance, will do the same thing, though not as frequently. There results a pressure within the long canals, and facial paralysis, deafness and blindness may ensue. This means that more salvarsan is indicated, also more mercury, large doses of potassium iodid, and elimination by means of pilocarpin, in order to bring about the desired effect. I think this paper of Dr. Stein's is one of the best contributions we have ever had on this subject.

Dr. Harry Kahn: Just a word in regard to deafness from salvarsan. I know of one case in which a onesided deafness resulted from one dose of salvarsan, which did not disappear after a second dose, mercurial and eliminative treatment. The patient was still deaf at the end of six months. A one-sided deafness means there is at least something in this action on some part of the ear.

Dr. Louis K. Guggenheim: There is usually doubt in cases of auditory nerve involvement, following the injection of salvarsan, as to whether the condition is luetic or a result of the selective action of the arsenic preparation, and as far as I know there is no single case reported where there is absolute certainty as to this. I recently examined a patient in whose case there was no doubt as to the absence of lues. Enormous doses of salvarsan were given—three injections within one month. Several weeks following the last injection there occurred vertigo, disturbance of equilibrium and deafness (right

ear), all within eight hours after the aural complication was first noticed. The Wassermann test was negative, and arsenic was found in the urine five months after the first injection.

Dr. Robert Sonnenschein: I simply wish to call attention to the fact that Neumann, among others, states that those cases of obstinate otitis externa diffusa in which no bacillus pyocyaneus or other distinct infectious agent can be found, should be viewed as possibly of luetic origin. In some of these cases no treatment other than an antiluetic one is of any avail.

Dr. J. Gordon Wilson: It may be of interest to refer to some experiments carried on to determine the action of organic arsenic compounds on the acoustic and optic nerves. As you know, salvarsan belongs to this organic arsenic group. I think it is established that such organic arsenic compounds can have a definite action on the second and eighth nerves of some animals, causing vestibular irritation and blindness. These experiments have been conducted on animals which have a very easily irritated vestibular mechanism. The important point established so far is that only such animals show the labyrinth reaction to these drugs as have this susceptible mechanism. It remains to be seen whether we can by injuring or depressing the activity of the eighth nerve in nonsusceptible animals produce similar labyrinthine phenomena. The pathologic changes I have observed are distinct. They consist in leucocyte exudation and rapid formation of plasma cells along the course of the eighth nerve, with changes in the vestibular nuclei.

Dr. H. W. Loeb: I would like to refer to a case reported by me some time ago. A young man was found to have a chancre; the chancre was excised and spirochetes found present. He was given a dose of salvarsan on the next day. Three weeks later, not having any further treatment nor any other symptoms, he became attacked with nausea and nystagmus towards the opposite side, and deafness in the right ear. The nystagmus continued for some time; the deafness has never been overcome. There was never present a single syphilitic lesion except the chancre. He had no further treatment, that is, up to the time he left my observation. I only saw him with reference to his ear, but it seems to me that the effect could hardly be ascribed to anything but to the salvarsan,

since it meets with the findings of other case reports on the subject.

Dr. E. L. Opie: I feel that I have very little to add to this discussion. I am always impressed with something, and the discussion of this in relation to the specialist, how the special anatomic factors in relation to pathology of such an organ as the ear have such direct bearing upon the symptomatology, convinces me that the subject can only be pursued with advantage by those who are directly associated with the clinical phenomena. And it seems to me, further, that such a study of pathology is one of the most important means of advancing that particular specialty. In regard to this subject, I am very much impressed with how little is known definitely as to the anatomic distribution of syphilitic lesions within the ear. Of course, the difficulty of making anatomic observations is very great. Indeed, the descriptions of the local effect of syphilis on different parts of the ear, so far as the slight investigations I have made of the literature on the subject, strikes me particularly unsatisfactory. From the standpoint of general pathology, one feature is to me particularly interesting; that is the fundamental reason for the location of syphilis in the ear, because the same thing applies to the localization of syphilis on any part of the body, indeed, but especially in relation to the syphilis of the nervous system.

Dr. Stein, in closing: I would just like to say again that I have had cases of deafness following the treatment with salvarsan, but none of them have persisted any length of time. I know of no single case I can recall that has any permanent impairment of hearing as the result of any treatment I have given them by this method. I have had involvement of hearing immediately after the introduction of the salvarsan, but it quickly cleared up. I will admit I know nothing definite about the subject, as I was just stating my own experience and trying to relate the experiences of others. but it is possible that this remedy has a slight toxic action, as Dr. Wilson says, for the eighth nerve; but if that is true, it seems strange that among the hundred thousand of cases injected and treated by this method, that there are not more cases reported of paralysis—it is almost inconceivable to think there can be such a selective toxic action. I hardly feel as if we can take any of the cases reported, or many others of

apparent permanent deafness, very seriously until we know more about how these cases were treated. It is necessary to know the exact details of the amount used, of the method employed, and the period over which they were treated. Upon all this hinges the recovery of their deafness. The discussion has been confined almost entirely to the salvarsan feature of the paper, which I wanted to eliminate as much as possible. I was particularly anxious to hear some of the St. Louis gentlemen discuss the case of intracranial syphilis that I reported, but was sadly disappointed.

Paper: A Study of the Etiology of Nasal Hydrorrhea, With Case Reports.*

By Harry Kahn, M. D.

DISCUSSION.

Dr. Sluder: I was greatly interested in the doctor's paper. This has been a subject of much interest to me. I agree that it is in all probability, at least as far as we can make out, an involvement of the sympathetic. Where that involvement lies, though, is to my mind exceedingly difficult to locate. Some ten years ago Dr. Stein began the injection of the posterior nerve supply, which is tantamount to the ganglion, also the anterior nerve supply. I have not spoken with him for a long time to know what his ideas are concerning the anterior supply, but I believe that his ideas concerning the posterior supply are unchanged. At a point further back this same sympathetic supply is exposed in the sphenoidal sinus, and one of the most intractable of these cases I have seen at any time followed sphenoidal empyema. The underlying lesion I believe to be a hyperplastic sinusitis which, so far as I know, is not described; a condition which presents the same picture that it was my privilege to see the gentleman demonstrate this afternoon, following Dr. Kahn's idea. Later I began the intraspinal application of various things, and for this particular patient a 5 per cent solution of salicylate of soda, which proved to be almost magic in itself. It checks up the sneezing, it controls the swelling, and rapidly diminishes the swelling that follows in acute inflammatory conditions, and has been almost specific. On the other hand,

*See page 184.

in an experiment, menthol aggravated it into a condition that required a grain of morphin to overcome the intense discomfort thereby produced.

DR. STEIN: My interest in this subject of nasal hydrorrhea was aroused at the time we were doing our work some years ago with alcohol injections in the attempt to treat hyperesthetic rhinitis. At that time I was considerably encouraged by two confreres to extend my efforts to checking this disorder of nasal hydrorrhea, instead of confining my treatment to the hyperesthetic type of rhinitis. The first case I tried it on was a woman who had been exposed to dust from a long automobile ride, producing a very severe attack of watery discharge from both nostrils, swelling about the eyes, etc. She was treated by the injection of the anterior nasal nerve with an 85 per cent alcoholic solution. Immediately we had the characteristic reaction of severe pain, following the course of the distribution of these nerves, and from that moment there was no further discharge. I particularly avoided in this case any suggestion whatever as to the effect of the treatment. I was anxious to find out whether it would have any beneficial effect or not, so I made no promise. I merely said I would try this and see what it would do, that it might be of benefit. This result lasted one month, when she returned to me with a slight attack, the following day. I injected her again and that terminated her trouble. I have had occasion to inject a few more cases of this disorder in the same way, using a milder solution of alcohol—65 per cent—and in all of the cases, barring three, it has been successful. Of these three one was a Chinaman, brought to the clinic with a mass of nasal polypi and a most profuse watery discharge, so I thought it a good case to try it on. We first injected, afterwards operated on him, but there resulted no improvement until the polypi were all removed. I believe that some of these cases are caused by such primary disturbance as a polypi hidden away like that. Since hearing Haskin's paper on the relationship between the sympathetic nerve and the fifth nerve, I have become a convert to the belief that this disorder is purely one of sympathetic character or a vasomotor disturbance.

DR. SCHOLZ: I agree with Dr. Kahn in his assumption that nasal hydrorrhea is the result of a disturbance in the nervous

system. In an individual with a hypersensitive nervous system, a very slight point of irritation in the nose is sufficient to precipitate the nasal phase of the disease. While I believe that nasal hydrorrhea rests upon a disturbance in the nervous system, I feel there may be some general ailment to account for the latter, and we must not lose sight of this fact in the treatment of these cases. A case which I have had under my observation for several years clearly illustrates this fact. The wife of a prominent physician, who has always had the best of attention, perfect home surroundings, and is free from worry and care, etc., had long been suffering from nasal hydrorrhea. At the time I examined her I found the tissues about the middle turbinates hypertrophic and edematous. Feeling that the local nasal lesion was probably the exciting cause, I directed my attention to the correction of the same, but all treatment along these lines failed. A more thorough general examination of the patient was then made by Dr. Jesse Myer, and it was found that she was anemic; the blood being very low in hemoglobin. The patient was then treated for her anemia and her run down condition, and as the hemoglobin approached normal, the nasal hydrorrhea grew milder, and at last ceased entirely; even the local nasal lesions cleared up. Not long after this the patient gave birth to a child, and shortly thereafter the nasal hydrorrhea returned. But again treatment for her anemia gave prompt relief. She has had several attacks since, but invariably these were controlled by general treatment. While one case cannot permit us to come to a conclusion, I still feel that we must not lose sight of the general health of the patient in this condition.

DR. KAHN, in closing: I want to thank the gentlemen for their discussion. I purposely omitted the hyperplastic ethmoiditis because that per se does cause a hydrorrhea. My thesis deals only with cases with no anatomic pathologic lesion other than in the mucous membrane.

As regards the doctor's case, that might occur and has occurred: and even in my own case of hydrorrhea the blood was absolutely negative, the patient showed no physical findings, and yet had the hydrorrhea; so there must be something in the nose which causes these hydrorrheas which demonstrate themselves only from the mucous membrane of the nose.

Esophagoscopy.*

By Stanton A. Friedberg, M. D.

DISCUSSION.

Dr. L. K. Guggenheim: I should like to mention in connection with this subject a case which very beautifully illustrates the possibility of finding something other than a foreign body when a foreign body case comes to one. We all know that the majority of foreign bodies in the esophagus pass down into the stomach before a patient consults the physician, the abrasion or bruise caused by it being misinterpreted for a lodgment in the esophagus, etc. This particular case gave the history of having swallowed too large a piece of pig's foot, which became lodged in the esophagus, and for two weeks prior to the time I saw the patient he had been unable to swallow any solid food. I went in and found no evidence whatever of the pig's foot; instead, I found a very beautiful, pathologically speaking, cancer of the esophagus. The obstruction caused by the new growth made it difficult for the large piece of pig's foot to pass. There resulted an increase in the previously existing obstruction which, in turn, resulted in the patient's thinking that the pig's foot had remained in the esophagus.

Dr. Scholz: I would like briefly to relate the histories of two cases which I believe to be instructive, the first, because of the size of the foreign body swallowed. A young man swallowed a ten inch, four pronged table fork. Radiograms were made which showed the fork lodged in the upper portion of the esophagus, prongs up. When I examined the patient with the esophagoscope, several hours later, I failed to find the fork in the esophagus. Dr. Max Myer removed the foreign body from the stomach by means of a gastrostomy.

The other case is instructive because of certain phenomena which led to an error in diagnosis. A man, about fifty years of age, was referred to me because of difficulty in deglutition, and for the purpose of an esophagoscopy. While making the usual preliminary examination of the patient, I found that the radial pulses could be readily palpated, but as the arms were gradually raised, the left grew weaker, and was not at all palpable when the arm reached the level of the

*See page 123.

shoulder. The examination of the chest revealed an area of increased dullness about the arch of the aorta. A distinct purring bruit could be heard, so that a diagnosis of probable aneurism was made. Dr. Horace Soper, who was in consultation at the time, made a fluoroscopic examination and found a pulsating mass of about the size of one's fist in the region of the aorta. When the patient swallowed a bismuth mixture, a shadow could be seen to pass down to about the level of the arch of the aorta, here to hesitate a moment, and from here deflected to the left several inches, in about the course of a semicircle, then seen to find its way freely to the stomach. We felt our tentative diagnosis of aortic aneurism was correct, and for that reason did not pass the esophagoscope, but postmortem examination revealed a carcinoma about the size of a large orange, springing, most likely, from the bronchial lymph glands. The tumor had broken down in its center, the mass having ruptured into the esophagus above, and a second fistulous tract from the cavity in the tumor communicated with the esophagus below, so that the bismuth swallowed had in reality left the esophagus, passed through the tumor mass, and then returned to the esophagus by means of a second fistula. This case has been put on record by Dr. Horace Soper.

DR. BECK: I want to call attention to one point in Dr. Friedberg's paper, and that is his criticism of the unreliability of the X-ray in properly locating the foreign body, to the effect that one position shows the foreign body at one level and another position reveals it at an entirely different location. This criticism, while true of single pictures, will not hold good with reference to stereoscopic roentgenograms, in which the foreign body is seen always in the same location.

DR. SAUER: I think the most important point is the size of the foreign bodies, for I have observed that it is much easier to find a large foreign body than a small one.

DR. FRIEDBERG, in closing: Just one word. We cannot afford to miss a coin, as in many instances that is the only remuneration that one obtains from this variety of cases.

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

Diagnosis, Prognosis and Treatment of Cervical Abscesses of Aural Origin.

DEODATO DE CARLI (*Jour. of Laryngology*, January, 1913), considering diagnosis, prognosis, and treatment of cervical abscesses of otitic origin, says superficial adenitis is characterized by a small painful tumor of rapid formation. If pus can be squeezed out of the ear on gently pressing the neck, the diagnosis is certain. Deep cervical abscesses, the socalled Bezold's mastoiditis, present difficulties; there is a slow formation of a swelling at the insertion of the sternomastoid and tendency to spread downwards, backwards, with limitation of movement of the head. Pus is too deep for fluctuation to be perceived. Left to themselves cervical abscesses tend to spread to the mediastinum, following at first natural ways and then breaking these barriers. Treatment should begin at the ear as soon as a presumptive diagnosis can be made. *Richards.*

Some Notes on Scarlet Red as a Dressing After the Radical Mastoid Operation, Based on the Observation of Fifteen Cases.

THOS. W. E. ROSS (*Jour. of Laryngology*, April, 1913) reports on the use of scarlet red (amidoazotoluol with B. naphthol) in fifteen cases of radical mastoid as an after-dressing to hasten epithelization of the wound cavity. The periods varied from twenty to forty-four days, the average being five weeks. The use of the red ointment is best delayed until healthy granulation has been set up by the use of bismuth gauze; the red ointment is then applied for periods of forty-eight hours, ribbon gauze saturated with the ointment being the medium. An interval of twenty-four hours is left between each application, when bismuth gauze or eucalyptus vaselin is to be used. A temporary increase of discharge may be expected after the first one or two applications. The method requires careful supervision to prevent exuberant granulations and the formation of pockets. The contour of the cavity is well maintained and the epithelium is strong. *Richards.*

The Significance of Fever in Cases of Mastoiditis Complicating Acute and Chronic Suppurative Otitis Media.

RAYMOND VEREL (*Jour. of Laryngology*, May, 1913) has analyzed one hundred and twenty-five cases of mastoiditis with reference to the question of fever in connection with involvement of the mastoid. In ninety-six, or 77 per cent, of the cases of acute mastoiditis complicating acute and chronic otitis media there was no fever (temperature of 100° F. or over).

Out of the twenty-nine cases in which fever was present, an intracranial complication was found in twenty-two cases; and in two of these the temperature could be explained by the presence of such condition as septicemia and pulmonary tuberculosis. In two cases there was no mastoiditis. In only three cases (2.4 per cent) no condition other than the mastoiditis was found at operation to account for the fever. Thus mastoiditis of itself very rarely gives rise to fever (temperature of 100° F. or over); if fever be present, we must suspect an intracranial complication or some general toxic condition.

Richards.

The Jarisch Herxheimer Reaction in the Organ of Hearing After Treatment by Salvarsan.

KARL THEIMER (*Jour. of Laryngology*, May, 1913, p. 225), since the introduction of the salvarsan treatment, has noticed that a not inconsiderable number of cases have been described in which injury to the internal ear had to be recorded. These affections are of the internal ear, of the vestibular or of the cochlear apparatus alone, or of both together, in patients who are already subjects of an aural lesion. In some of these cases the phenomena disappear in the course of time, some after repeated salvarsan treatment, some after mercurial treatment. In others the lesions proved to be permanent.

He noticed affections of one or both sections of the internal ear in persons whose ears had been previously proved to be normal. The phenomena appear a long time—weeks or months—after injection. Here, also, the symptoms may disappear after a time, or they may persist.

Affections of one or both sections of the internal ear in persons whose ears have been previously proved to be normal, appear immediately or shortly after the injection. They persist for a long time, and may prove to be permanent.

An affection of the internal ear, attacking by preference the vestibular apparatus solely, appears immediately or soon after the injection, and disappears as rapidly, at most within a few days, and so completely that the phenomena become absolutely normal again.

The only cases of injury to the internal ear after salvarsan which can be described as manifesting the Herxheimer reaction are those in which the phenomena appear shortly after the injection and rapidly disappear. The disturbances affect the vestibular portion of the nerve for the most part, and, as a rule, induce the clinical appearances of a complete paralysis of the vestibular apparatus. *Richards.*

The Treatment of Meningitis of Otitic Origin.

WM. MILLIGAN (*Jour. of Laryngology*, May, 1913, p. 242) considers the successful treatment of meningitis is dependent upon early diagnosis and early drainage. Special knowledge is required in order to make an early diagnosis, and courage to operate in the absence of the full ensemble of textbook symptoms. The localized form known as extradural abscess is often a more common complication of acute than of chronic otitis media, and more frequently found in the posterior than in the middle fossa, and also with frequency are encountered extradural collections of pus when their existence is quite unsuspected. Diminishing alkalinity denotes progressive bacterial invasion, while an acid reaction indicates that definite purulency has become established. All cases of purulent meningitis are preceded by a stage of serous meningitis, when a desperate fight is made by the meninges and cerebrospinal fluid to resist bacterial invasion. Metabolism of the products of bacterial life is such as to destroy or partially destroy the existing carbohydrates or proteins in the cerebrospinal fluid. There is a certain test (Kopetzky) for determining when serous meningitis is becoming purulent. So long as the cerebrospinal fluid remains alkalin, even though turbid, there is reason to expect a good result from operative interference, but should it become turbid and acid the prognosis is grave. Bacteria are not found in films or in cultures in the early stages of the disease. It is at the stage of the disease when the cerebrospinal fluid, although possibly turbid, is still alkalin and capable of reducing the copper in Fehling's solution, that

lumbar puncture as a therapeutic measure is so advantageous. The use of urotropin is said to have a beneficial effect, and to assist in keeping the cerebrospinal fluid aseptic. Its rapid elimination, partly as a formaldehyd, and the fact that it is found in the cerebrospinal fluid soon after its administration by the mouth, has given rise to the idea that it might possess a certain antiseptic value. To be successful any treatment of otitic purulent meningitis presupposes elimination of the primary focus of infection, whether it be a middle or an internal ear suppuration, or, as is so frequent, of the two combined. The internal ear is not only by far the most frequent avenue of infection to the meninges, but is also the most dangerous, because it leads to direct infection of the posterior fossa. Milligan has performed the Haynes' opertion twice, but in neither case did the patient survive. His records show thirty-seven cases of meningitis serosa socalled, with twenty-nine recoveries and eight fatal cases. In these eight cases the cerebrospinal fluid became definitely purulent, and although one or other form of decompression operation was performed, it was unsuccessful. Of fourteen cases diagnosed at the time of admission to hospital to be suffering from purulent meningitis and submitted to operation, ten died, and in four cases it would have been wiser to have attempted no operation, while the remaining six cases that died had a sporting chance of recovery. Four, or 40 per cent, recovered.

Milligan also states that if he had a case of chronic suppurative middle or internal ear disease, with the temperature going up and arterial tension increasing, with diminishing alkalinity of the cerebrospinal fluid and absence of copper reduction on boiling with Fehling's solution, he would recommend a decompression operation, because such a case was obviously tending toward purulency, and one was justified in operating at once to prevent it.

Dr. Dan McKenzie emphasizes the diagnostic importance of pain—occipital headache associated with some rigidity of the neck. In early meningitis one can elicit early rigidity of neck muscles. Occipital headache, whether combined with this rigidity or not, should lead to lumbar puncture and examination of the fluid. *Richards.*

Erysipelas Following the Radical Mastoid Operaiton.

J. S. FRASER (*Jour. of Laryngology,* September, 1913). Erysipelas, according to Fraser, is much more common following the radical mastoid operation than is supposed. He reports one case of erysipelas in which the correct diagnosis was not made until the fifth day after operation, because of the fact that for two days after operation all signs and symptoms indicated a mild meningitis, and it was not until on the fifth day that the erysipelas blush appeared. In this instance there was a marked nystagmus to the diseased side, which disappeared on the fourth day, and also all signs of the supposed meningitis. The nystagmus was attributed to some irritation in the posterior fossa. Erysipelas, according to Ruttin, in its early symptoms is very hard to differentiate from intracranial complications. The severe headaches, tenderness on pressure, high temperature and slight stiffness of the neck may be present before the erysipelas blush appears on the skin. Spontaneous nystagmus on looking to the side is a common symptom of postoperative erysipelas, and may be due either to serous labyrinthitis or some intracranial causes. The nystagmus varies its direction and intensity, and may occur along with the fever and headache before the skin becomes red, or it may accompany the erysipelas, disappearing before the fall of the temperature or along with it. The total duration is only a few days. The return of erysipelas may be indicated by a fresh occurrence of nystagmus. *Richards.*

The Operative Treatment of Labyrinthine Vertigo in Nonsuppurative Disease of the Internal Ear.

WILLIAM MILLIGAN (*Jour. of Laryngology,* October, 1912, p. 521) limits surgical intervention to those cases which have failed to respond to prolonged general and local treatment, and to those in which, from the circumstances of the patient, it is necessary to secure a rapid destruction of an overexcited and irritable labyrinth, as determined by the caloric and other tests.

Postoperative increase of deafness hardly requires consideration, as with an increase of irritative symptoms there is a progressive loss of hearing; in addition to which the amount of hearing at the time of the contemplated operation is, as a rule, so small as to be almost a negligible quantity.

In careful hands the risks of facial paralysis are not great, provided that the field of operation is kept thoroughly well illuminated; that some form of labyrinth chisel (e. g., Lake's) is used to open the semicircular canals and the cochlea, and that no attempt is made to lever out pieces of bone, utilizing the bony wall of the fallopian aqueduct as a fulcrum. The destruction of the terminal filaments of the vestibular nerve should be as thorough as possible. Practically, the more thorough the operation is performed, the less the amount of post-operative shock. For this reason, the complete opening up of the external semicircular canal and of the ampullary orifice of the posterior canal is advocated, in order to effectually destroy the peripheral terminations of the vestibular nerve.

When tinnitus is not much complained of, and when it is worth while attemtping to preserve whatever auditory function is still left, operative interference should be limited to the opening up of the external semicircular canal and vestibule after the performance of an ordinary Schwartze operation. In performing a Schwartze operation with this object in view, the opening through the bone should be made as large as possible, so as to freely expose the bony covering of the external semicircular canal which lies at the bottom of the excavation.

The external semicircular canal should now be opened with Lake's chisels, and followed both forwards and backwards to the vestibule. Should difficulty be experienced in reaching the ampullary orifice of the posterior canal from the vestibule, the canal should be opened farther back and followed forwards. A careful and very thorough curetting of the vestibule should now be made, followed by swabbing with some strong antiseptic. Healing is invariably rapid, provided there is no sepsis, and complete relief from vertigo should be secured in from five to six days. If vertigo persists longer, the deduction is that the operation has not been thoroughly performed; that is, that the peripheral terminations of the vestibular nerve have not been thoroughly destroyed. By working forwards and backwards along the course of the external canal the vestibule is opened. The fossula rotunda is then enlarged, and the bony wall of the cochlea between the fenestra rotunda and the fenestra ovalis, along with the stapes, removed, thus leaving the bony walls of the fallopian aqueduct

standing out like the arch of a bridge (end on, as it were) between the cochleavestibular system in front, and the canaliculovestibular system behind. *Richards.*

Diseases of the Middle Ear and Mastoid Cells Based Upon a Study of 454 Autopsies and 2,232 Cases of Diphtheria, Scarlet Fever and Measles.

C. R. C. BORDEN (*Boston Med. and Surg. Jour.*, February, 1913). In measles, middle ear and mastoid symptoms occur during the height of the active process, and adults are particularly subject to mastoiditis. In scarlet fever, middle ear involvement comes at any time during the course of the disease, and is not limited to the active stage. Adults are not very liable to mastoiditis in scarlet fever. In diphtheria, otitis media or mastoiditis are not as active as in scarlet fever or measles; thus, diagnosis is far more difficult to make.

With active inflammation in the heart, lungs or joints, infection of the middle ear or mastoid cells causes the inflammation in these organs to become more active and dangerous to the life of the patient, but usually these inflammatory processes are much relieved after a prompt and efficient treatment of the aural inflammation.

Next to bony tissue itself, bony cavities lined with mucous membrane are among the lowest in resistance of all tissues of the human body. So long as the phagocytes and the antibodies have sufficient power to overcome the bacterial invasion, no systemic symptoms occur. For this reason infected middle ears occasionally smoulder for weeks before showing active symptoms.

Often with the appearance of active symptoms in the heart, lungs, or joints, one or both middle ears show marked signs of inflammation, or spontaneously rupture. If at such times the middle ear or mastoid cells send bacteria into the blood stream, the devitalized organs are in a position to absorb them, and they themselves become foci of infection to still further increase the toxemia of the patient.

The author cites four cases of diphtheria patients who were not particularly ill upon entering the hospital. Each improved or showed no symptoms for sixty-seven, forty-four, eight, and ten days, respectively. Then they developed weakness or prostration, and gradually died without any definite symptoms.

The autopsies showed all of them to have had double acute middle ear disease; and three of the four cases, either single or double mastoiditis. Not one of the four showed any reason to suspect the middle ear during life.

In view of the large percentage of aural involvement in very sick and fatal cases, the closest possible watch must be kept on the middle ear. Such close observation will reveal many inflamed and swollen drum membranes. Once determined, this condition is easily handled; but as distinct stereotyped symptoms are lacking, the observer should carefully look for the merest suspicion of trouble in this locality and possess sufficient skill to note the slightest trace of altered natural conditions.

To establish drainage in a comparatively healthy patient is simple enough, but to keep such drainage open in a very sick patient is entirely a different matter. Repeated drum incisions are often called for and should be resorted to as long as necessary. Ether operation should be avoided as much as possible when important organs are involved; but they are never absolutely contraindicated when necessity demands. Very sick persons will take ether better than would be supposed. The free drainage of pus, with its attending toxins, will do far more good than ether with its irritation to inflamed tissue will do harm.

Ice bags should never be used in patients seriously ill with contagious diseases. The development of symptoms in the middle ear or mastoid should be encouraged as much as possible. Ice bags or other methods of cold application very effectually mask the symptoms, and should be absolutely avoided.

The matter of prompt and thorough treatment cannot be too strongly emphasized. Practically every case of brain abscess and every infected jugular vein is the result of failure to diagnose and treat comparatively simple conditions in the early stages.

The author bases his remarks upon the following clinical cases:

SCARLET FEVER.

Total number of cases	746
With otitis media	65—11%
Without otitis media	681

MEASLES.

Total number of cases	456
With otitis media	125—28%
Without otitis media	331

DIPHTHERIA.

Total number of cases	962
With otitis media	28—2.9%
Without otitis media	934

MIXED INFECTIONS.

Total number of cases	68
With otitis media	30—44%
Without otitis media	38

Total number of cases, 2,232. Number of autopsies, 333.
Richards.

Tibial Bone Transplantation in the Postoperative Mastoid Wound.

MILLTON J. BALLIN (*Medical Record*, March, 1913). In order to hasten healing in the mastoid wound and to lessen postoperative deformity, Ballin has in three cases transplanted a piece of bone with periosteum attached from the tibia of the patient to the mastoid wound and then sutured the skin. The portion removed is cut to fit the mastoid cavity, which must have good granulations. The operation is done about ten days after the original operation, and if the case goes well, healing is complete a few days thereafter. The cavity underneath its bone graft fills with blood clot which later organizes into bone. For hard eburnated mastoids the procedure is not indicated. It has so far been used in but three cases. Preservation of the periosteum of the transplanted bone is essential. *Richards.*

The Treatment of Persistent Otorrhea in Infants and Young Children.

WENDELL C. PHILLIPS (*Med. Record*, July, 1913) describes a type of persistent otorrhea in children which appears at first as an acute middle ear suppuration, usually following one of the exanthemata, grip, or pneumonia. The discharge from the onset is profuse and persistent, continuing beyond the third to seventh day after the temperature has become normal and the pain has subsided, and there is no marked dropping of the

posterosuperior canal wall. When the discharge continues longer than three weeks, and does not yield to local measures, there is suggestion of involvement beyond the tympanic cavity of the aditus and mastoid antrum, and the author in such cases has obtained excellent results by establishing postauricular drainage, and hence through and through drainage, by means of the simple mastoid operation. In young children, when the operation has been performed any time between four weeks and three months, the results have been excellent. In patients with markedly hypertrophied tonsils and adenoids, when the purulent otorrhea has extended beyond the temperature stage, it is best to delay postauricular drainage until after the removal of the tonsils and adenoids. The advantages of this operation are that it terminates quickly an otherwise persistent otorrhea, prevents a chronic purulent otitis media, insures against further extension of local bone necrosis, and restores and retains the hearing function.

Richards.

Sinus Thrombosis of Otitic Origin.

S. J. CROWE (*Johns Hopkins Hosp. Bull.*, November, 1912) thinks that any acute obstruction to the outflow of blood through the sigmoid sinus, jugular bulb or internal vein on one side may be diagnosed by means of the following test. This test is based on purely mechanical principles. The anatomic conditions are schematically represented in the accompanying diagram:

1. No appreciable evidence of stasis is seen in the retinal or supraorbital veins when one internal jugular is compressed with the finger.

2. Pressure on both internal jugular veins at the same time produces a marked dilatation of the veins of the fundi and of the anastomotic vessels connecting the intracranial with the extracranial venous circulation.

3. When the pressure is suddenly released on one side, while it is maintained on the other, the engorged veins of the anastomotic system and the fundi will immediately empty.

If the results in any individual case differ markedly from those above, it must be concluded that there is either an anomaly of the intracranial venous circulation, or some pathologic condition which is obstructing the outflow of the blood from the brain.

During this examination the patient should breathe freely and naturally; the collar should be loosened so as to expose the neck and upper part of the chest; the fundi should be examined by the direct method, or with an electric ophthalmoscope, while an assistant compresses the jugular veins with the tips of the finger. The compression should not be maintained longer than absolutely necessary, for it may be possible in this way to rupture a diseased vein or dislodge a portion of the thrombus.

Among clinical conditions associated with an obstruction to the outflow of blood from the brain, the formation of a thrombus in the sigmoid sinus, secondary to an infection of the middle ear, is by far the most frequent and most important. Sinus thrombosis appears with equal frequency as a complication of acute and chronic cases of otitis media, and not infrequently the diagnosis offers great difficulty. Due to the anatomic position of the jugular bulb in the middle ear, it is possible to have a primary bulb thrombosis, with the sigmoid and transverse sinuses normal in appearance; and the condition may not be recognized, even at an exploratory operation. One of the cardinal symptoms of sinus thrombosis is a remittent fever with chills, due to the serious nature of the malady; it is desirable to know at an early stage of the disease whether the symptoms are due to a sinus thrombosis or to other conditions such as angina, pneumonia, malaria, the initial stage of one of the infectious diseases of children, meningitis or brain abscess. *Richards.*

Temporosphenoidal Abscess.

Francis P. Emerson (*Jour. Amer. Med. Assoc.*, September, 1913) employs in cases of brain abscess the Haynes operation for drainage through the cisterna magna, and does not consider it a difficult procedure. It is doubtful whether the Haynes or any other procedure is effective except in the early stages of a purulent meningitis. This may depend on whether the infection is always accompanied by edema and serous effusion. It is possible, as a primary manifestation, that there might be a plastic exudate, fibrinous in character, which would not drain until a later stage, when it became purulent. Even if this were so, a decompression operation might so relieve the intracranial pressure that the patient would have a chance

to survive until the leucocytes could take care of the exudate. The author reports in detail a case of temporosphenoidal abscess with recovery. In this instance the pressure of a large brain abscess made the diagnosis of a general meningitis uncertain. Three or four weeks after operation, a slight blocking of the cisterna magna caused hiccoughs and vomiting. In cases of brain abscess it is very important to keep careful watch of the drainage, even weeks after the operation, and the cigarette drain is the ideal method. *Richards.*

The Radical Ear Operation.

CULLEN F. WELTY (*Jour. Amer. Med. Assoc.*, September, 1913) reports some excellent results in hearing after a radical ear operation by improved Thiersch grafts applied at the time of operation. In a series of eighteen cases there was improvement in hearing in 78 per cent, no change in two, or 11 per cent, and the hearing was made worse in 16 per cent. In six cases the whisper, after operation, was heard from a distance of twenty-five feet or more; in three cases, fifteen feet or more; in three cases, six feet; and in three cases it was made worse because of complication before or after the operation. In four cases the duration of after-treatment was three weeks; in ten cases, four weeks; in one case five weeks, and in three cases six weeks. He allows for improvement in hearing if there is lengthened or normal bone conduction and the patient does not hear a whisper from a distance of more than six to nine feet. In all patients under fifty years of age who hear a whisper from a distance of five feet or less, hearing will be improved unless something goes seriously wrong with the operative procedure, such as removing the graft too soon (so that granulation tissue takes its place), or allowing it to remain permanently, in which case it will act as a mechanical hindrance. In patients who hear a whisper from a distance of twenty feet or more, there is an improvement in hearing. In patients who hear a whisper from ten to fifteen feet, there can be no guarantee of improved hearing. Provided the patient has an intact labyrinth, and the hearing for a whisper is below ten feet, there is certainty of improvement.

Richards.

Chronic Obstructive Middle Ear Deafness.

GEO. E. SHAMBAUGH (*Jour. Amer. Med. Assoc.*, September, 1913) suggests, in place of the term "chronic catarrhal otitis media," the use of the terms "chronic simple otitis media" and "chronic nonpurulent otitis media," as better conveying the fundamental conditions of the cases, which is that of infection in the membrane lining in the middle ear chamber, with round cell infiltration and thickening and subsequent formation of fibrous connective tissue. This process is from time to time associated with an acute infection in the nasopharynx, and at these times secretion can usually be detected in the tympanum—not by inspection of the drum membrane, but by inflation of the tube. The chronic middle ear process may or may not be associated with a persisting tubal occlusion. The membrana tympani, even when the drum membrane is not retracted, usually appears more or less thickened and opaque—enough so, to indicate the type of process involving the membrane lining the tympanum. The degree of retraction of the drum membrane is no index to the defect in the hearing or of the improvement to be expected from inflation. Prognosis as regards progress of the deafness is better if the occlusion of the tube has disappeared and the existing defect is dependent upon changes in the tympanum which has ceased to be active, which the open tube indicates. Persistent tubal occlusion indicates a still active process and further increase in deafness. The presence of secondary changes in the labyrinth gives a bad prognosis; and the labyrinth defect is best detected by noting the defect for the higher notes of the Galton whistle. The defect in hearing found in cases of persistent tubal occlusion, especially if secretion is in the tympanum, is more readily improved by treatment.

Richards.

Radical Mastoid Operation in Children.

DAVID G. YATES (*Am. Jour. Surgery*, August, 1913) only performs the radical operation in children when there is necrosis in both the middle ear and mastoid cells, or when the middle ear is so far damaged that it cannot be restored to usefulness even if suppuration should be arrested. The presence of a foul discharge, of cholesteatoma, of polypi or granulations, of displaced ossicles, of fistulæ leading into the attic or back toward the aditus ad antrum, point to the necessity

of a radical operation. Enlarged tonsils and adenoids undoubtedly influence acute inflammation of the middle ear and frequently help to keep up the discharge; their removal will not cure an otorrhea that arises from dead bones. Children under three or four years of age with chronic suppuration may, as a rule, be treated on the expectant plan. Children from five years of age and upward, with discharging ears of two or three years' duration and with growing deafness on the affected side, who have not yielded to persistent local treatment, are submitted to the operation. Every physician knows the dangers attending a chronic running ear and its possible complications, and if an operation can be perfected which will not endanger life, which will preserve a useful degree of function, and leave no deformity, it is the thing to choose rather than to allow suppuration with all its uncertainties and dangers to go on indefinitely.

Yates in his technic places special emphasis upon his incision, which begins at a point midway between the meatus and mastoid tip, is curved sharply backward and ends at a point above the meatus; thus made, the incision allows the sutured edges to have support, at least in part of their extent, after operation is completed. The incision is carried through skin. muscle, and periosteum as far upward as the lower border of the temporal muscle, where the skin only is cut through. Where a previous simple mastoid has been performed, it is necessary to cut through the scar. Elevation should not be attempted until the periosteum is thoroughly incised and the bleeding stopped. This done, elevation of the whole thickness of the flap is easily accomplished without bruising or mauling the tissue—an important factor in the healing. In very young children, when the bone is found hard and barren of cells except for a small antrum lined with necrotic membrane and filled with granulations, it is better to perform the Stacke operation and simply clean out the antrum and middle ear, thereby throwing them into one cavity and leaving the greater part of the mastoid cells untouched. In children great care is used not to too zealously curette upon the internal tympanic wall and in the region of the round and oval windows.

The plastic flap is so made that when completed the meatus is about one-third larger than normal, it is round and oval and

not noticeable. In making the flap the membranous canal is split up to the margin of the concha with a straight, blunt-pointed knife, which is then turned at right angles to this incision and a cut is made curving to the floor of the meatus and thereby allowing the lower flap to drop freely to the bottom of the bony cavity. A similar cut is made upward, starting again at the end of the first incision. Then enough fibrous tissue is dissected away from the skin flaps to fit snugly into the walls of the bony cavity. In case of too abundant tissue, a triangular section is cut out and the flaps anchored in position by a single catgut suture.

The after-treatment consists in removing the cotton balls which are used to hold the graft in position; these are removed two to four days after operation and the cavity treated by tamponing with gauze until epithelization is completed. For cleansing purposes simple saline solutions are used, and in cases of exuberant granulations applications of silver nitrate are used. *Richards.*

Operative Treatment of Otitic Meningitis.

Ewing W. Day (*Jour. Surg., Gyn. and Obsts.*, April, 1913) reports on the indications for and the results of operative treatment of suppurative otitic meningitis. There were fifty-seven cases treated since 1897; fifty-three of otitic origin, two from the nose, and two following pneumonia. They were all cases of diffuse suppurative meningitis, diagnosis being confirmed in thirty-eight cases by autopsy. Four cases recovered, three after operation, and one after vaccine therapy. One of the operated cases died later from a reinfecting meningitis.

Meningitis followed chronic purulent otitis and its acute exacerbations. Seven cases were complicated by sinus thrombosis, ten by purulent labyrinthitis. In forty-eight cases a mastoid operation, either simple or radical, was performed, supplemented in thirty-three cases by other procedures directed to the infected meninges; in ten cases by dural drains; in eight by simple incision of the cisterna magna; in one by drainage of the lateral ventricle; in one by lavage of the ventricle; in four by intraspinal injection of urotropin solution; in two by intraspinal injection of oxycyanid of mercury.

For diagnosis the lumbar puncture gives us the most reliable information as to the condition of the meninges. Slight

turbidity cannot be accepted as a positive sign of a diffuse process, for it may result from a very limited area of infection. In serous meningitis a slight turbidity with a markedly increased number of polynuclear leucocytes in the presence of pyogenic organism, indicates an extensive involvement and a correspondingly hopeless condition.

It has been said that the findings from examination of the spinal fluid might under certain conditions lead to a diagnosis of a more serious condition than really existed, but Day did not find this to be the case. In three cases the examination of the spinal fluid led to the underestimation of the gravity of the brain condition. In these, repeated punctures showed a slightly clouded fluid, nonpathogenic bacteria, and leucocytes, but no infective organisms. On postmortem examination streptococci were obtained in abundance, both by smears and culture from the dural spaces. The bacteriology of the primary aural infections offers no indication for or against operative interference. The organism found in the ear at time of examination will not always be identical with that in the dura. This is especially true in chronic purulent otitis media. The course of the disease is more influenced by the virulence of the infecting organism.

The cases were treated either singly or in combination with injection of drugs into the spinal canal, vaccines and sera, or operation. The treatment of suppurative meningitis by the administration of drugs has proven useless, with the possible exception of the use of urotropin as a prophylactic. Theoretically, surgery should give relief. Practically, the mortality has not been changed by it.

Urotropin was used intraspinally in four cases. Three of these had streptococci in the spinal fluid, and one pneumococci. There was improvement in only one case, a streptococcic. Intraspinal injections of oxycyanid of mercury were used in two cases, but without results, for any benefit derived in the meninges from the drug was offset by inflammation in the bladder and kidneys, acute enough to cause early death. The results of vaccine therapy have been such that it has been discontinued.

Operative procedure in otitic meningitis should aim first as a prophylaxis, and second at a radical cure. A prophylactic operation eradicates the primary focus in the middle ear and

adjacent bony cavities, thus preventing the spread of infection to the meninges. As a curative measure, when meningitis has actually developed, it is of little use in arresting the inflammation and should only be considered as a minor part of the operative procedure.

With no signs of infection beyond the temporal bone, no useless exposure of the dura to possible infection should be considered. With the use of the dural drain it has been concluded that the drain does not satisfactorily drain the central lobe of the cerebellum or lessen the inflammatory action over the base of the brain or spinal cord. The drainage of the cerebral fluid, which occurs at first after the operation and which generally ceases in from twenty-four to thirty-six hours, does not stop from plugging around the bony opening, but causes the brain pressure to destroy the spaces no longer distended by the fluid, and permanently seals them off from the remaining arachnoid. Three cases were treated by drainage of the cisterna magna, an area wider and higher up than dural drainage in the temporal region. The dural drainage is effective, but to a limited extent. When used in the circumscribed form of the disease, it should and does give good results. The successfully treated cases reported in literature are probably of this class. *Richards.*

Regeneration of Membrana Tympani.

GEO. M. COATES (*Laryngoscope*, January, 1913) reports three cases of spontaneous reformation of ear drums that had been practically completely destroyed. In each case the duration of time between the beginning of the suppuration and the beginning of the reparative process had been long—one forty, one twenty, and one seven years; but the reparative process, once begun, continued spontaneously until the drum had been completely replaced. The hearing in one case remained stationary, in one case it was increased, and in the last case it was markedly diminished. He concludes, from the study of these three cases, that perforations of the largest size, under favorable circumstances, close spontaneously and without adhesions, even years after the inception of the disease and the cessation of all discharge. That the tympanic cavity always has a tendency to heal, provided the exciting cause has been removed. That the reason for so many failures in restoring

the continuity of the tympanic membranes is due to the lowered vitality of the tissues, and that by waiting before instituting active treatment to build up the general health of the individual and to improve the local condition, better results may possibly be obtained. The complete closure of a perforation is of a doubtful advantage, because the hearing is usually decreased, although the danger of recurrence of the disease is much less. *Richards.*

Some Curable Affections of the Acoustic Nerve.

ALFRED LEWY (*Laryngoscope,* March, 1913, p. 190) believes that it is possible to recognize earlier the curable and noncurable forms of nerve deafness by ascertaining the cause through systematic and accurate functional tests. Besides the careful investigation of the etiology and the use of the tuning forks, observation may be necessary for a short time. Nerve degeneration is more apt to occur in men; in those who work in a continuous noise; in both sexes past the middle age; in young people as the result of one of the infectious diseases, meningitis, mumps, or hereditary syphilis; while in older people acquired syphilis and later arteriosclerosis are factors. The infectious diseases may cause nerve deafness without suppurative lesions, and for this reason should always be closely observed; and in many instances the patient comes to the observation of the otologist too late. The loss of hearing is usually severe, unequal in both ears, except when very advanced, and the loss of the upper tone limit, or of other areas of the scale, is marked. The use of quinin, alcohol, nicotin poison, chloroform, carbon monoxid, oil of chenopodium, mushroom, lead, mercury, phosphorus, silver, carbon dioxid, carbon disulphate, smoke, ergot, and morphin, all play an important part in the cause of nerve deafness. *Richards.*

Tinnitus Aurium.

EDMUND PRINCE FOWLER (*Laryngoscope,* March, 1913) has obtained some relief from cases of tinnitus by the application of a tight constricting neckband which gives relief by increasing the labyrinthine pressure or by the relief of the undertension in the middle ear, which is brought about by the congestion outbalancing the weighting effects of this congestion on the middle ear mechanism. In neurasthenic patients relief

from the tinnitus comes after wearing the neckband for long periods of time, whereas in nonneurasthenics relief is afforded as long as the neckband and other appropriate treatment is continued. Tinnitus in otosclerosis is influenced sometimes by the increased labyrinthine pressure induced by the neckband, but rarely by the increased pressure in the external meatus. In nerve deafness a neckband will diminish tinnitus unless the determining factor of such tinnitus is extralabyrinthine, in which case it will but rarely lessen it. In chronic nonsuppurating otitis with tinnitus, if a constricting neckband increases the tinnitus, the determining factors are mainly in the middle ear, and are more or less influenced by treatment, according to the character of the lesions. If a constricting neckband diminishes the tinnitus, the determining factors are either in the labyrinth or its walls, and are due to reflex irritations or to general conditions, such as anemia, neurasthenia, with or without accompanying middle ear lesions. Prognosis in these cases is better than is first to be expected. If meatus closure and the constricting neckband have no effect on a marked tinnitus, the results are negative, and probably sclerotic conditions exist. If the neckband diminishes tinnitus, and increased air pressure in the external auditory canal has no effect, there is probably extreme ankylosis or otosclerosis.

Richards.

Relief of Auditory Disturbances.

WELLS P. EAGLETON (*Laryngoscope*, May, 1913) describes in detail three cases of deafness associated with intracranial tumors, where a slight direct pressure caused suspension of the function of the acoustic nerve at one of its two vulnerable points, enough to produce deafness, the relief of the pressure restoring the hearing. It is concluded from these intracranial lesions of the posterior fossa that there may occur early reduction of the excitability of the vestibular apparatus, not only of the affected, but of the unaffected side, and perhaps an oscillation of the function of the cochlear apparatus of the unaffected side; all possibly due to the edema of the nerve sheath, which condition may be revealed by repeated careful examinations by qualitative test, and are relieved, at least temporarily, by decompression. *Richards.*

Resonators, With Special Reference to the Schaefer Apparatus.

ROBERT SONNENSCHEIN (*Laryngoscope*, May, 1913) describes and calls attention to the use of the Schaefer resonators, which are adjustable to any tone between A^1 (108 v. d.) to a little above c^3 (1024 v. d.). These resonators can be used in physical research in the analysis of tones, in testing tuning forks to prove up the actual tone claimed to be present, to determine the pitch of unmarked forks, and for testing the absolute duration of hearing. With one of these resonators inserted in the ear, a tuning fork, no longer heard alone, will be appreciated, but when its sound ceases to be heard even with reinforcement, it is known that the limit of hearing is reached. To determine absolute deafness, forks not heard at all alone can be used with the resonator to establish a correct diagnosis. *Richards.*

Obliteration of the Mastoid Cavity.

SAMUEL IGLAUER (*Laryngoscope*, May, 1913) describes his method of closing a mastoid wound by means of a flap taken from the temporal muscle, which greatly reduces the time of the after-treatment and gives an excellent cosmetic result. After performing a simple mastoid operation in which the mastoid cavity is thoroughly excavated, the original mastoid incision is prolonged upward and forward into the hairy scalp. The incision, concaved and about one and one-half inches long, lies immediately anterior to the posterior border of the temporal muscles. The scalp is dissected downward and forward, exposing the temporal fascia, and the posterior portion of the temporal muscle and fascia are freed from the pericranium; a triangular flap, with the apex downward, is then formed by splitting off the exposed muscle in the line of its fibers, the pedicle being formed of the fiber passing under the zygomatic arch, and contains branches of the temporal arteries. The flap is rotated downward and backward into the mastoid cavity. If the temporal ridge is prominent, it is chiseled away with the underlying bone, to provide a groove for the pedicle; and if the pedicle is too short or thick, it is lengthened by cutting obliquely across some of its anterior fibers. The flap is fastened to the periosteum by catgut sutures at the lower angle of the incision. A rubber drainage tube is inserted from the antrum to the lower angle of the incision. A puncture is then made through the scalp over the

dead space left by the removal of the muscle flap and a gauze wick is inserted at this point. Sutures are made in the scalp incision, the upper ones being tied and the lower ones untied to allow for drainage, but these lower ones are drawn taut on the first or second day after the operation. The mastoid incision is closed by interrupted sutures. Layers of gauze are placed over the dead space and a very firm bandage is applied. This operation is readily done and assures proper drainage.

Richards.

Ear Labyrinth Inflammation.

HENNINGER (*Laryngoscope*, July, 1913), from a review of the literature of acute labyrinthitis, finds it to be either serous or purulent, and due to an invasion of the labyrinth by either toxins or pathogenic germs. It may be either diffuse or circumscribed, and arises as a complication in acute or chronic suppuration of the middle ear and mastoid, and also during the course of severe infections, as diphtheria and scarlatina. In serous labyrinthitis the onset may be either sudden or gradual; temperature normal or slightly elevated; pulse usually rapid. Tinnitus, dizziness, nausea, and disturbance of equilibrium is often complained of. The hearing is reduced, but the vestibular apparatus responds to stimulation. Spontaneous nystagmus is present and is directed toward the diseased side. These conditions indicate the early stages with gradual onset. Cases of sudden onset present conditions difficult to differentiate from the purulent type.

Purulent labyrinthitis produces nausea and vomiting, fever, headache, tinnitus (early), deafness later, nystagmus, loss of labyrinthine irritability, and vertigo. The onset is sudden, with a distinct rise in temperature, often accompanied by facial paralysis. At first the nystagmus is to the diseased side, but later in the progress of the disease the end organs of the vestibular nerve lose their function, and the nystagmus is to the sound side. This is often known as increased irritability of the sound labyrinth. The vertigo and disturbance of equilibrium continues for several days, and the patient is unable to assume the erect position, lies on the side towards which the nystagmus is directed, and so has less subjective sensations from the nystagmus. All efforts to stimulate the vestibular apparatus are futile, and by applying the Neumann noise apparatus to the sound ear, the diseased ear is incapable

of detecting the most penetrating sound. A complication arising from purulent labyrinthitis may be meningitis, or a cerebral or cerebellar abscess; the latter is the most frequent complication. Acute purulent labyrinthitis must be differentiated from cerebellar abscess, as nystagmus plays an important part in both conditions. Nystagmus towards the affected side may be due to a beginning circumscribed labyrinthitis or a cerebellar abscess. A cerebellar abscess cannot be excluded prior to an operation on the labyrinth. After a conjoint radical mastoid operation and labyrinth operation, if the rotatory nystagmus is directed toward the diseased side, a diagnosis of cerebellar abscess can be made.

Cases of serous labyrinthitis call for a mastoid operation, simple or radical, after which the patient is carefully observed. Cases with labyrinthine complications following acute mastoiditis or an acute exacerbation of a chronic process are put to bed for absolute rest after the removal of the primary foci. Circumscribed labyrinthitis is treated expectantly. *Richards.*

The Diagnosis of Rupture Into the Lateral Ventricle and of Acute Internal Meningitis.

ERICH RUTTIN (*Laryngoscope*, August, 1913) reports three cases of brain abscess in which the postmortem examinations revealed a rupture of the abscess into the right lateral ventricle, causing pyocephalus internus. In these cases there was a sudden onset of vertical nystagmus, a valuable symptom of acute pyocephalus, and the most frequent form of meningitis after a temporal lobe abscess. In a case of temporal lobe abscess showing vertical nystagmus, even after opening the abscess there may be rupture into the ventricle or infection of the ventricle through a thin partition. *Richards.*

Technic of Labyrinth Operation.

EDWARD B. DENCH (*Laryngoscope*, August, 1913) believes a labyrinth operation in the future will be an explorative procedure in certain cases of impairment of hearing, progressive in type and involving the labyrinth. He describes an ideal operation performed upon the cadaver in nonsuppurative labyrinthine lesions. This type of operation has many possibilities, in that it can be performed without a preliminary radical operation, it destroys the contents of the horizontal canal, the

superior canal and the vestibule. It is performed through the ordinary mastoid operative field, providing the operation included the zygomatic cells, without taking down the posterior wall of the external auditory canal. If the cochlea is to be opened, it is necessary to perform a complete radical operation to obtain a perfect view of the promontory and to enable the operator to remove the bony wall of the first and a portion of the second turns of the cochlea by taking down the bony ridge of bone which separates the oval and round windows. Such interference with the cochlea would not be necessary in cases suffering from vertiginous symptoms.

Richards.

Decompressive Operations in Intracranial Complications of Otitic Origin.

WILLIAM MILLIGAN (*Brit. Med. Jour.*, August, 1912, p. 427). Decompressive operations for the relief of meningitis have been used by Milligan in twelve cases. Four of the twelve cases were undertaken when the patient was in extremis, and all were fatal. Of the remaining eight cases, five died and three recovered, the percentage of recoveries being only a little over 26 per cent.

The pressure within the skull cap at once crowds the brain through the opening made, and this undoubtedly interferes with the much desired drainage. By slipping strands of gauze or pieces of rubber tissue between the dura and the brain, a very fair system of drainage may be secured and maintained.

Richards.

The Technic and After-Treatment of the Radical Mastoid Operation.

WILLIAM MILLIGAN (*Brit. Med. Jour.*, September, 1913), by comparing the various methods of after-treatment of the radical mastoid operation by packing, alcohol drops, antiseptic powders, cell proliferants, skin grafting, and the use of blood clots, finds the best success by the use of blood clot dressing, healing resulting in the shortest time, on an average of 6.2 weeks, in twenty cases. Second in preference is the application to the granulating surface of one or other of the cell proliferants, namely, scarlet red, amidoazotoluol, pellidol, azodolen, and allantrin. He advocates the closure of the eustachian tube at its nasopharyngeal end, because closure at its tympanic orifice is dangerous, on account of the uncertain proximity of

the internal carotid artery; because curettement, if the tube was to have a chance to cicatrize, destroys the mucous glands of the part whose presence is essential to retain for good results; and lastly the permanent closure of its tympanic orifice is a failure. The mucosa of the inner tympanic wall should be retained, if not too degenerated, in order to secure the greatest amount of postoperative hearing power.

Richards.

Ocular Imbalance and Auditory Affections.

S. ALISON BRADBURNE (*Brit. Med. Jour.*, October, 1912) finds that the examination of affected cases of disease of the labyrinth shows a majority of them causing an ocular disturbance in the maintenance of parallelism of the vertical meridians. That when disease tends to invade the deeper parts in the neighborhood of the auditory organ, an ocular imbalance follows, which is manifest in a difference in the elevation of the eyes. *Richards.*

Aural Vertigo, Nonsuppurative.

RICHARD LAKE (*Lancet*, December, 1912, p. 1638) divides aural vertigo into three classes, and reaches the conclusion that chronic middle ear deafness and arteriosclerosis are the most frequent causes of aural vertigo. He finds a large amount of benefit can be derived from the use of drugs, but by no means are all cases capable of this relief. He places rather small reliance upon the rotary and caloric reactions. One is able to make one's diagnosis and prognosis in the class of cases under consideration equally as well without their employment. In twenty cases of labyrinthine vertigo where there had been no perforation in the labyrinth, and fourteen of whom had had no previous suppuration, he found only twice fluid on opening the labyrinth. In these two cases there was a considerable amount of fluid, and one had also an extremely large semicircular canal, apparently four or five times greater than the normal size. Even now he is not prepared to say that these cases contained fluid under pressure. He thinks it rather difficult to consider from a purely mechanical point of view how fluid can be retained in such a nonvascular bony cavity. In the way of medicines, he has found cases of labyrinthine hemorrhage to be absolutely beyond our reach. In labyrinthine cases pilocarpin should be tried, increasing the dose as rapidly as is consistent with safety, and continuing it

for about two weeks. In arteriosclerotic cases he confines himself to the use of hydrobromic acid, with a small dose of quinin or iodid of potassium. In the socalled Ménière's disease cases he uses small doses of quinin with hydrobromic acid. *Richards.*

Sporadic Congenital Deafness, and Deafness From Syphilis.

JOHN KERR LOVE (*Glasgow Med. Jour.*, February, 1913), after an extensive study of syphilis and its relation to deafness in children, draws the following conclusions:

1. Syphilis is an infectious disease, which, having entered the blood of the parents, is transmitted to the children.

2. It stunts, and dwarfs, and kills children. Many of them are stillborn, many die within a few months or during the first year, and of those who survive some become blind, some deaf, some both blind and deaf, while some continue in apparently good health.

3. The Wassermann reaction or test nearly always gives a positive result when the combination of keratitis (blindness) and deafness occurs in the child of syphilitic parents. Occasionally the result is negative in the presence of the combination. It sometimes gives a positive result in the apparently healthy brothers and sisters of those affected by blindness or deafness, thus showing that they are really infected, and that at a later date symptoms may develop.

4. A common cause of death among these syphilitic children is meningitis. It is the commonest cause of their death, and this disease occurs most commonly during the first or second years.

5. Untreated or insufficiently treated syphilis in the parent may be discovered by the Wassermann reaction many years after infection. Healthy and diseased children may be born at any stage of the family history, but the usual family record is that the earliest children are stillborn, then diseased children, and, lastly, healthy children. The later children have the best chance to live.

These conclusions were based on the examination of the blood of one hundred and fifty persons, about half of whom were born deaf, and a third of whom have become deaf since birth. The remaining cases were not deaf at all, but were related to others in the list who are deaf.

In some families the cells which form their make up are so deficient in those determiners or factors which go to the complete make up of a perfect nervous system, that the children born into such families are feeble minded or epileptic, or are born deaf. These defects may be accentuated by such poisons as alcohol and syphilis. Within the family stream the defect is permanent, and is developed to its utmost by the intermingling of similar cells or by the marriage of those who are related by blood. The defect may become less frequent by streams or families uniting, one of which is perfect or in whom the defect does not exist. But the defect cannot be stamped out so long as the family goes on at all, and the practical question is whether the defect is so serious for the individual and for the community that the latter should take steps to protect itself. *Richards.*

The Question of Curing Otitic Meningitis.

R. KOTZ (*Munch. med. Woch.*, December, 1912, p. 2863) reports as healed three cases of otitic meningitis. Careful study of the cases would seem to place them under the class of labyrinthine trouble with certain meningitic symptoms, rather than direct cases of meningitis. They are also not checked up by any of the newer methods of diagnosis, such as the chemical test suggested by Dr. Kopetzky. *Richards.*

Otitis Externa Furunculosa.

A. ZOGRAFFDES (*Wien. klin. Woch.*, December, 1912) disinfects the external canal as well as the pinna, and then makes from three to five cuts in the point where he has previously determined with the probe the greatest pain to be located, and then applies a sterile strip of gauze moistened in 10 per cent carbolic acid solution. He anesthetizes the place with cocain. The pain lasts from one to two hours, but has completely disappeared in five to six hours after the time of incision.

Richards.

Syphilitic Infections of the Middle Ear.

CARL LUDERS, Wiesbaden (*Deut. med. Woch.*, January, 1913, p. 225). The external ear, middle ear and labyrinth are liable to syphilitic infections as well as other parts of the body. Middle ear infections of syphilitic origin, like those of tuberculosis, do not show any specific character. The principal

symptom is a more or less sudden and increasing loss of hearing, sometimes accompanied by dizziness. The author reports five cases in which the ear phenomena occurred, as follows:

In one case, two years after initial infection.

In two cases, five years after initial infection.

In one case, six years after initial infection.

In one case the disease was hereditary. Facial paralysis on the same side as the affected ear supervened in one case; in one case, fever, nausea, vomiting, dizziness and nystagmus were present. The author believes that in all of his cases the disease manifested itself in the form of a gumma of the middle ear.

Treatment, consisting of paracentesis, when indicated, plus vigorous antisyphilitic measures, proved effective in nearly all cases. In one case, neosalvarsan was employed; 0.4 gram was injected six times at ten to twelve day intervals, with good results. In nasal and nasopharyngeal conditions the author has usually had equally good results with mercury and potassium iodid as with salvarsan. Iodid potassium is particularly useful. *Richards.*

New Method of Direct Dilatation of the Eustachian Tube.

A. V. GYERGYAI (*Deut. med. Woch.*, June, 1913) has devised a metal dilator with which to stretch the pharyngeal end of the eustachian tube. It is introduced through the pharyngeal speculum of the straight type, either that of the author or of Yankauer. The results in a series of cases already treated by usual methods without satisfactory results was very gratifying, marked improvement in hearing taking place. The method is offered as an addition and not as a substitute for other methods. The dilator is moulded to the shape of the membranous eustachian tube as determined by experiments on the cadaver. *Richards.*

Prognosis and Treatment of Tinnitus.

WITTMAACK (*Deut. med. Woch.*, September, 1912) finds one of the most troublesome complications of which patients complain is subjective noises or tinnitus. He advises that before treatment is undertaken for these noises a careful search for the underlying cause be made. Quite a few are circulatory in character, and in many cases directly trans-

mitted, as from aneurism, increased blood pressure, pyemia, anemia, and cardiac diseases. The treatment should be directed to the cause only.

There is another class in which the noises are of a nervous type, and in these cases the patient is best treated by having in his room some clock or watch which by very loud ticking will take away the annoyance of the tinnitus. The device which produces a sound nearest to the sound of which the patient complains is the best. The patient should sleep in the noisiest room in the house, and after a time becomes impervious to the aural noises.

The group of cases in which the noises are dependent upon changes in the sound apparatus itself are of two classes: those depending upon pressure in the external canals, as from cerumen, and in the causation of which all the acute and chronic affections of the middle ear may be concerned. Noises which are dependent upon diseased processes in the internal ear may be caused by the degeneration of the sound perceiving apparatus itself and the nerves directly therein concerned. These noises vary greatly in character. The treatment of these two classes of noises must have for its basis the original cause, so far as can be determined. Various medicines, such as quinin and salicylic acid, may produce ear noises. The prolonged use of alcohol and nicotin and organic nerve affections such as tabes and paralysis, and such constitutional diseases as nephritis, diabetes, pernicious anemia, leukemia, cachexia, and the like, may be the cause.

The remedies which lessen the sensitiveness of the nerve apparatus are the bromids and valerians. When no specific cause can be determined, it may be of advanatge to use iodin, pilocarpin, arsenic, or thyroid preparations. The best hydrotherapeutic methods are bathing the feet in hot water and the Sitz baths. Reactive hyperemia may be produced by massage, bougieing, electrolysis, hot air applications, the electric current and the like. It is only after a careful consideration of all the factors in the cases that the noises can be satisfactorily treated, and then in many instances the results are far from satisfactory and the question of complete destruction of the labyrinth may have to be considered, provided that noises are of sufficient annoyance to the patient. *Richards.*

Hallucinations of Hearing and Diseases of the Ear.

JOHN H. W. RHEIN (*New York Medical Journal*, June 14, 1913) reports three cases, all women, one over fifty and two over sixty, where in connection with vertigo and tinnitus there was a complaint of hearing voices. The aural condition of two of the cases was examined and shown to be only a catarrhal involvement of the middle ear.

Rhein feels that the possibility of arterial changes in the brain must be recognized in all three cases, and that the nutrition of the auditory centers has been more or less implicated.

He concludes that "while the occurrence of hallucinations of hearing associated with disturbances of the peripheral auditory apparatus does not necessarily indicate the onset of insanity, there can be little doubt that this phenomenon is an expression of an unstable psychic equilibrium, and is therefore actually within the domain of psychiatry." *Harris.*

The Prevention of Deafness.

G. HUDSON-MAKUEN (*New York Medical Journal*, August 16, 1913). In the consideration of this important subject the author refers to certain statistics recently compiled by the United States Board of the Census, which he summarizes as follows:

"Deaf persons having deaf relatives, however they are married, and hearing persons having deaf relatives and married to the deaf, are very liable to have deaf offspring. The proportion of marriages resulting in deaf offspring and the proportion of deaf children born therefrom being almost invariably highest where both of the parents had deaf relatives, and next where one of them had deaf relatives, and least where neither had deaf relatives. The marriage of the deaf most liable to result in deaf offspring are the consanguineous marriages. Out of thirty-one such marriages, fourteen, or 45 per cent, resulted in deaf offspring; and of the one hundred children born from these marriages, thirty, or 30 per cent, were deaf."

In the author's opinion, what is really inherited is not deafness, but physical anomalies which result in deafness. This view leads him to believe that even acquired deafness in adult life, socalled "catarrhal deafness," may be regarded as hereditary in so far as the particular physical and systemic condi-

tions which cause it, such as rheumatism or gout, are hereditary or transmissible.

As remedies or means of preventing deafness acquired through heredity, he advocates, first of all, sterilization. He admits that we must still regard this as a radical measure, and therefore would have the bringing together of the deaf in large schools, a condition which has been accountable for the great increase in the marriage of the deaf in recent years, done away with, and in place of this recommends special day school instruction, where there will be less close association of the sexes. The prevention of acquired deafness is to be secured by preventing the development of the producing pathologic causes. Adenectomy, so generally practiced now, should be performed much earlier. Careful and thorough examination of the ears of young children is demanded, and an earlier treatment of the conditions found. Periodic examination of the ears, as is practiced in reference to the eyes, is also a desirable measure. Finally, all measures which will control the development or spread of syphilis, shown now to be a potent cause of deafness, are called for. *Harris.*

The Roentgen Ray in the Treatment of Otosclerosis.

ORTLOFF (*Archiv. für Ohrenheilkunde,* Vol. 90, p. 233). Jaulin and Schwartz have already experimented with the Roentgen ray in otosclerosis, but Ortloff has conducted a careful and independent investigation. This represents ten cases treated in Bloch's clinic in Freiburg, i. Br. The method of treatment is set forth in detail. Müller and Müller-Uri tubes were employed, water cooled, together with the radiometer of Labourad-Moure, and the quantimeter of Kienbock. The ray was applied on three successive days in one-third the normal dose, and then an interval of from two to three weeks allowed to elapse, when it was begun again. The results of the treatment are set forth in each case. These are as a whole unsatisfactory. Temporary improvement was noted in individual cases, but relapses took place. No marked effect was witnessed upon the tinnitus. *Harris.*

Heat in the Treatment of Diseases of the Ear.

MALJUTIN (*Archiv. für Ohrenheilkunde,* Vol. 90, p. 245), a number of years ago, advocated the employment of heated

bog soil in the various diseases of the ear. In the time that has elapsed he has had no occasion to change his views, and again urges its employment in the following conditions:

First, in the different forms of the exudative otitis, in the stage in which, in spite of inflammation and massage, the serous or mucous exudate remains dammed up in the middle ear.

Second, in the socalled adhesive catarrh, where the formation of connective tissue has begun, which fills the middle ear and causes the walls to become stuck together.

Third, in the different diseases involving the joints of the bones of the ear of a rheumatic or gouty nature.

Fourth, in typical otosclerosis in the beginning stage, where the stapes is beginning to be ankylosed in the window, and we hope to be able to bring the ossifying process in the capsule to a standstill by meanus of the increased metabolism.

Fifth, the syphilitic affections of the sound receptive apparatus.

In the hands of one of his associates the results of this treatment have been most satisfactory. The hearing ability, not merely with the speaking voice, but for the musical tones, has been noticeably improved.

The technic is simple. The bog, heated to a temperature of from 35 to 50 degrees R., is spread upon a cloth of sufficient size to entirely cover the ear. This method has the disadvantage of losing its heat quickly. To remedy this, the author has devised a mechanical contrivance kept warm by electricity. Inasmuch as the bog soil cannot always be obtained, he has been lately substituting for it simply dry heat.

He does not give a full report of his results, but sets forth the history of nine cases recently under his care, which bear out his claim that he has been able to improve many cases by this method where others methods have failed. *Harris.*

A Contribution to the Subject of Streptococcus Mucosus, With a Report of Twenty-one Mastoid Complications Caused by the Streptococcus Mucosus.

ZEMAN (*Archiv. für Ohrenheilkunde*, Vol. 92, p. 1). A full report of the twenty-one cases with an analysis of each one is given. An extended consideration is devoted to the character of the complications and to the postoperative course

of the disease with the outcome. Based on the study of these twenty-one cases, the author makes the following conclusions:

First, operations dependent upon the otitis of the streptococcus mucosus are relatively frequent. The course of the mucosus otitis is in about 50 per cent of the cases typical, i. e., a long prodromal stage with slight symptoms and characteristic drum appearance, a late development of the suppuration or a complete absence of the same.

Second, in most cases there is no fever and sudden development of complications. In other cases the mucosus suppuration presents the clinical picture of an influenza otitis, and in no particular differs from the ordinary otitis.

Third, the mucosus suppurations very frequently lead to mastoid and endocranial operations. The pathologic and anatomic condition of the mucosus mastoid is typical, i. e., many scattered areas, later merging, separated by more or less healthy bone substance. Very often the inflammatory region is located primarily in the mucous membrane and the cells of the mastoid process.

Fourth, of the endocranial complications the perisinus abscess is most frequently observed in more than half the cases.

Fifth, the tendency of the mastoid ostitis is very slight towards a perforation of the cortex externally, which more often breaks into the cranial cavity.

Sixth, as regards treatment, an accurate extended observation of patients during the prodromal symptoms is necessary.

Seventh, a bacteriologic examination of the pus from the mastoid is important. When the streptococcus mucosus is found, a careful examination is necessary in order to correctly recognize peculiarities of this organism.

Eighth, every elevation of temperature after the operation, excluding other causes, points to the existence of an area of suppuration somewhere, and indicates a further operation.

Ninth, on this account the primary suture of the postauricular wound is contraindicated.

The duration of healing is very long, and averages sixty-two days. The prognosis is favorable when it is possible at an early date to eliminate altogether the foci of suppuration.

Harris.

The Absolute Indication for Operation Upon the Labyrinth.

LEIDLER (*Archiv. für Ohrenheilkunde*, Vol. 93, p. 73). This contribution from the pen of Professor Alexander's first assistant in the Vienna policlinic is especially welcome at the present time, representing as it does the results of the Alexander clinic in the treatment of labyrinthine diseases.

Leidler's conclusions are based upon a study of twenty-seven cases operated upon by Alexander or himself. These are as follows:

1. Every diseased labyrinth dependent upon a purulent otitis, whether acute or chronic, combined with a labyrinthogenous intracranial complication, must at once be operated upon. Of these complications, the lightest degree is represented by a persistent headache on the side of the affected ear.

2. Every labyrinth which shows involvement as the result of an acute or chronic otitis, with symptoms of acute diffuse labyrinth suppuration, advanced nystagmus of the third degree toward the healthy side, and lack of response to the turning test, must at once be operated upon, in case the temperature is more than 38°, or the symptoms do not improve within four days.

3. A labyrinth which, as the result of an acute or chronic otitis, is completely destroyed functionally, and does not comply with the conditions set forth in paragraphs one and two, must at once be operated upon, in connection with the radical opening of the antrum, in case a spot in the bony capsule shows a pathologic opening into the peri- or endolymphatic space (fistula, cholesteatoma, sequestrum, tumor, etc.), or where there are persistent symptoms of irritation of the labyrinth, dizziness, nystagmus, vomiting.

The three indications for operation are based entirely upon clinical experience, and have no relation to the pathologic and anatomic questions, especially that of the differential diagnosis of acute or purulent diseases of the labyrinth. This latter question is met in the second indication, where Leidler states that a general diffuse labyrinthitis must be at once operated upon if the temperature rises above 38°, or the symptoms persist in the same degree for more than four days. It is his experience that a serous labyrinthitis never shows a higher temperature than 38°, nor symptoms which do not begin to abate in their intensity within four days. The observations

cover a period of six years, from October, 1907, to July, 1913. There follows a full clinical report of the twenty-seven cases.

In most of the cases a typical labyrinthine operation was performed. That is, after a radical operation, the dura in the middle and posterior foci was freely opened and the labyrinth cleaned out, and the two points thrown together by the removal of the upper edge of the pyramid. The dura is then carefully mobilized and the labyrinth is removed to the extent of the diesased bone. In all the twenty-seven cases the labyrinthine disease depended upon a chronic otitis. In fifteen cases cholesteatoma was present.

Analyzing the results according to the three groups of indications, to group one belong thirteen cases (cases 1 to 13), and to the third group twelve cases (cases 16 to 27).

There were, then, of the twenty-seven cases, fifteen (groups one and two) complicated by intracranial disease. These represent, first, labyrinthogenous circumscribed purulent meningitis (4), second, labyrinthogenous diffuse purulent meningitis (7), third, serous meningitis (3), and fourth, cerebellar abscess (1).

In sixteen cases there was a fistula, for the most part in the horizontal canal. In five cases there was a more or less extended sequestrum of the labyrinth. Ten of the cases were acute, six subacute, nine chronic, that is, a latent diffuse purulent labyrinthitis. Of the twenty-seven cases, nineteen were cured, eight died, a percentage of 29.6 per cent of deaths and 70.4 cures. In estimating the prognosis, cases 11 and 12 are to be excluded, where meningitis had already developed. The twenty-five others, then, represent 24 per cent of fatalities and 76 per cent of cures. *Harris.*

Reeducation of the Deaf—A Restatement of the Method of Treating Progressive Deafness by Means of a Special Instrument Devised for This Purpose.

MAURICE (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie*, September-October, 1913). The author does not pretend to cure the cause of the trouble. He insists that both deafness and its cure is a relative term, and does not claim to restore hearing when total deafness exists. Reeducation is not the only treatment employed by him. The other methods are to be employed as usual. The principle involved is the same as the cultivation of the sense of touch in the

blind, or of the eyes in those who use the microscope. Urbantschitsch was the first to make use of the principle involved. The simplest application of the principle is that of shouting in the ear of the deaf. The range required, more than five octaves, makes it impossible to employ the human voice. Successful reeducation requires that the ear of the deaf person should be struck by a sound wave of a given intensity. This must be regulated for each ear. Finally, the sound should be sufficiently amplified to produce a pronounced massage.

Study of the different instruments previously devised has led to the employment of an electric apparatus which produces all vibrations from 100 to 4000 a second, a sufficient range for the education of all deaf persons. Maurice has given the name of the kinesiphone to his instrument. The kinesiphone produces in a word the disassociated elements of the human voice, amplifying them, regulating them, and varying them according to the particular case. It has a fivefold action upon the ear of the deaf. First, by mobilizing in a physiologic manner the organs of hearing, namely, the drum membrane and the ossicles; second, by stimulating the auditory receptivity of the deaf; third, by exciting the labyrinth, in which the nerve fibers commence to become sclerosed, atrophied and paralyzed; fourth, the sonorous massage produces a vasodilatation of which the trophic effect is decidedly marked, and there is a reappearance of cerumen and amelioration of the dry eczema of the auditory canal; fifth, the vibration of the kinesiphone favors contact of the cylindrical terminal ends and ciliated cells of the organ of Corti. A detailed account of the cases will be published in a short time.

The benefit to the hearing in a partially deaf person is permanent. When the patient is very deaf it is recommended, after the improvement has been obtained, that he continue to massage the ear by means of an ear trumpet with a double receptacle. Five minutes a day will be sufficient. The length of the treatment will depend upon the duration of the lesion, the age of the patient, and the cause of the deafness.

Harris.

Otosclerosis.

CITELLI (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie,* November-December, 1913). The uric acid toxemia of a gouty or diabetic nature is, according to the

author, an important cause of otosclerosis. This uricemia is wont to give rise to an ankylosis which in otosclerosis involves the articulation of the oval window. The author agrees with Denker in his recent view that the hypophysis is an important cause. The weighty role in bone development of certain glands with internal secretion is well known. Alteration in the secretion of one of these disturbs the dynamic equilibrium. Autointoxication is in the author's opinion another frequent cause of otosclerosis, proceeding, as it will, from a disturbed metabolism, the result of a perverted gland secretion. Of the glands of this system, the hypophysis is the most concerned with the disease of the throat and ear. The relation between otosclerosis and adenoids has been long recognized. The effect of adenoids in producing disease of the middle ear is well known. Based upon his previous demonstrations of the many intimate physiopathologic relations existing between adenoids and the pharyngeal pituitary body and those which are often found between adenoids and the central hypophysis, he believes that a far greater importance should be attached to the hypophysis system than to any other gland of the internal secretions in the etiology of otosclerosis.

With these preliminary observations he draws the following conclusions: That the disease consists essentially in a vascular osteoporosis of the labyrinthine capsule which can be caused very often by different general diseases. Among these he mentions, first, disease of the different endocranial glands, with probably a predominance of the cells of the hypophysis system; second, the different dyscrasias of uricemic origin—of these some have an etiologic and pathologic relation with the endocranial system; third, syphilis; fourth, osteomalacia and rickets; fifth, tuberculosis, etc. As regards the pathologic condition present, he believes that these should be divided into three groups. The first includes those cases in which the spongifying process has produced only an ankylosis of the stapes. Here the characteristic Bezold triad is found. Second, cases in which there is a bony fixation of the stapes and other foci of the spongifying process in the labyrinth capsule, associated with an atrophy of the labyrinthine membrane (corresponding to our socalled "mixed cases"). Third or intermediary group of cases in which there are multiple and

dissimilar foci of spongification without there being any ankylosis of the stapes, and in which there also exists symptoms of atrophy and degeneration of the labyrinthine membrane, especially of the cochlea. Because of these wide differences in symptoms, Citelli believes that instead of speaking of otosclerosis as a disease, it should be called a syndrome, and would substitute for the term "otosclerosis" that of "otosclerotic syndrome," or, better still, that of "otospongifying syndrome." He states, in conclusion, as regards the treatment, that the employment of the extract of hypophysis in tablet form has been a benefit in certain cases, especially as regards the relief of the tinnitus. *Harris.*

Labyrinth Operations for Severe Labyrinthine Vertigo.

MATTE (*Archiv. für Ohrenheilkunde*, 1912). The author's conclusions, based on five labyrinth operations, are as follows: Vertigo, caused by labyrinth disturbances alone, may be greatly relieved, or, as in one of his reported cases, completely cured, by operation. He believes that in the cases in which subjective noises still exist after the operation, they are caused by degeneration of nerves, particularly of the acusticus root. They are the extralabyrinthine noises, and are not dependent on the old idea of labyrinth pressure. The author's indications for opening the nonsuppurating labyrinth are unindurable subjective noises and extreme vertigo. *Theisen.*

The Diagnosis and Treatment of Brain Abscess.

F. HENKE (*Archiv. für Ohrenheilkunde*, 1912). The author's investigations were largely based on cases observed during the past ten years in the clinic of Prof. Gerber, in Königsberg. Among the cases were nine brain abscesses of otitic origin, of which eight were operated upon. Five of these were in the cerebrum and three in the cerebellum. Three of the five operated cases died, two being complicatd by sinus phlebitis, and one with meningitis. Two of the uncomplicated cases recovered.

Of the three cases of abscess in the cerebellum operated upon, one case, also complicated with sinus phlebitis, recovered; two died as a result of pyemia, and one, reported fully in this article, of respiratory paralysis. One of the most important points in the diagnosis of cerebellar abscesses is

the symptom described some years ago by Babinski. In abscesses in this region of the brain, patients are not able to make certain antagonistic movements pro- and supination, quickly and frequently repeated.

In considering the treatment, the author states that it is of great importance, even after the abscess has been evacuated, to pay close attention to the brain pressure. Lumbar puncture, if necessary, frequently repeated, will tend to greatly diminish the danger of an increase of the brain pressure. In cerebellar abscesses, also, this procedure may save the life of the patient, even after drainage has been established.

Theisen.

Further Examinations and Experiences in Regard to the Relations Between the Vestibular Apparatus and the Central Nervous System.

BÁRÁNY (*Wiener medicinische Wochenschrift,* Nos. 49 and 50, 1912), as the result of his investigations, comprising twenty-two autopsies, as well as five clinical cases, also acusticus tumors with extracerebellar locations, comes to the following conclusions: Tumors, in any location, can produce cerebellar symptoms, both on the same side and on the opposite side.

In order to distinguish "Herd" symptoms from surrounding conditions, it is necessary to make an exact examination of the spontaneous developments as well as thorough functional tests; for example, when spontaneous falling occurs, it does not necessarily mean that this points to a "Herd" symptom. It is important to examine a case not once, but many times. If the symptoms change, so that at times there is no falling, and no movement of the arm from one side to the other, a remote influence is fairly certain. If only a portion of the symptoms change, then there is probably a combination of "Herd" and surrounding disturbance. A passing nystagmus of varying itensity, or a permanent uniform severe nystagmus of intracranial character, is present in tumors of every localization. Severe disturbances of hearing, in cases of tumors outside of the posterior cranial fossa, occur rarely. Slight disturbances of hearing, similar to a lesion of the internal ear, are much more common. A one sided or double total deafness occurs perhaps only with acusticus tumors.

Ruttin has reported a case of deafness on one side with a

tumor of the temporal lobe. Frey, Claus and Bárány have reported cases in which the hearing was not disturbed in acusticus tumors. Tinnitus is not complained of much in cases of brain tumor. Severe attacks of vertigo are usually present in the beginning of tumors of any localization; later in the course of the disease spontaneous vertigo is usually absent. The author has rarely found the caloric reaction absent, except in cases of acusticus tumors. Most of the cases of brain tumor, in which a considerable pressure on the posterior cranial fossa exists, are almost entirely insensitive to vestibular irritation. Spontaneous vomiting occurs usually only in the beginning.

In most of the cases of decided pressure symptoms in the posterior cranial fossa, an increase of the vestibular reactions, both nystagmus (first described by Ruttin), as well as falling movements, can be determined. If pressure symptoms are absent, the irritability of the entire vestibular apparatus may be very slight. Even in tumors of the posterior cranial fossa this may be so. An increase of vestibular irritability is not important in diagnosing the seat of the tumor. No conclusions can be drawn from a single symptom. The entire neurologic picture and the course of the disease must be taken into account in making a diagnosis.

In conclusion, the author states that it is important for neurologists to make use of the newer methods of examination. *Theisen.*

Concerning the Cause of Permanent Opening and Cicatrization of Perforations of the Tympanic Membrane in Childhood.

GOMPERZ (*Wiener medicinische Wochenschrift*, No. 3, 1913). Perforations that will not heal are most frequent after the otitis of scarlet fever. Hereditary taints, particularly tuberculosis, are influential in causing a predisposition to this condition. The early treatment of a suppurative otitis, particularly a prompt incision, frequently prevents the development of larger defects. To bring about the healing of old perforations, the writer recommends the use of trichloracetic acid. *Theisen.*

II.—NOSE.

Supraturbinal Opening in Chronic Maxillary Sinusitis.

KUBO (*Archiv. für Laryngologie*, Bd. 26) has adopted the method first described by Siebenmann, of enlarging the natural opening of the antrum, as he considers it to offer the advantage of not readily closing, and of offering easier access, both for the operator and for the patient, in subsequent irrigation. A cutting instrument is employed similar to a Hartmann's conchotome and Killian's double curette. This is introduced into the region between the uncinate process and the accessory maxillary ostium. A sufficient amount of the margin is removed to produce a diameter of the opening of one-half centimeter. After the operation hydrogen peroxid is applied to check the bleeding, and the daily irrigation is performed through the opening. In some cases it is necessary to remove the uncinate process. *Goodale.*

Pathogenesis of Lupus of the Interior of the Nose in Its Relation to the Vicinity.

ALBANUS (*Archiv. für Laryngologie*, Bd. 27, Heft 2). The manner in which lupus may arise in the nose may be:

1. Hemotogenous.
2. Erogenous, or through contact. In both cases either as the first focus in the nose (primary nasal lupus), or by the existence of old foci (secondary nasal lupus).
3. As a primary infection in the nasal vestibule, particularly in the nasal recess, or as a transition of a scrofulous eczema of the nasal vestibule into lupus.
4. Lymphogenous. As the first visible lupus of the body in the nose, although actually a lymph gland had been previously infected, or as secondary nasal lupus, resulting from the extension of neighboring lupus to the interior of the nose by the lymph channels.
5. By continuity. Nasal lupus extends further into the neighborhood (primary nasal lupus), and its relation to the vicinity, or lupus extends from the vicinity into the nose (secondary nasal lupus).
6. Nasal lupus as the result of tuberculosis of the bones.
7. Extension towards the cranial cavity.

The relative frequency of these conditions is illustrated by a review of the statistics and by the author's experience. *Goodale.*

On the Operative Treatment of Collapse of the Alæ Nasi.

DAMM (*Archiv. für Laryngologie*, Bd. 27, Heft 2). By the author's method, a flap of mucous membrane from the septum, about six millimeters high and three millimeters broad, is cut out in such a fashion as to embrace the point of departure of the constricting band and extend about one and a half millimeters above it. The constricting band is then incised with a small knife completely through, in a posterior direction, so that the point of the knife lies free in the nasal passage. The fold is now cut flatwise through as far as the septum in such a fashion that the cut strikes exactly the upper end of the septal flap. By the union of both cuts, the flap hanging at the point of incision in the ala is entirely separated from the septum, and hangs free in the lumen of the nasal passage. The flap is now placed upwards in such a manner that the free end of the septal flap lies at the angle where the septum and the ala meet, leaving the defect of the septum uncovered. By firm tamponing the ala is stretched and the septal flap firmly approximated. The ala is then kept in its elevated position for at least two or three weeks. *Goodale.*

On Polyps of the Sphenoid Sinus.

KUBO (*Archiv. für Laryngologie*, Bd. 27, Heft 2). Polyps may arise from the orifices of the sphenoidal sinus, especially from the lowest portion. In the early stage of their development these polyps remain in the interior of the sinus and are found by chance on opening the cavity. They may also be recognized by a round polypoid prominence at the upper margin of the choanæ, immediately below the ostium. This appearance is an important objective sign of chronic sphenoidal sinusitis. In the later stage of their development they may become so large as to occlude the choana. Their differential diagnosis from polypi of the antrum is, therefore, very important from the therapeutic point of view. Since such polypi on account of their short pedicle resemble closely fibromata of the nasopharynx, careful examination must be made before operation. Most of the socalled choanal polypi are in reality sphenoidal polypi. In these cases the ostium of the sphenoidal sinus is usually large. Simple removal with the snare does not effect a radical cure. The sphenoidal sinus itself must be opened and treated. *Goodale.*

The Successful Treatment of Atrophic Rhinitis and Ozena—A New Remedy.

LOUIS JACOBS (*New York Medical Journal*, May 31, 1913) had in twenty cases employed scarlet red in the form of a suspension in the mucilage of acacia, of 5 per cent. His results have been uniformly good. In a short time the mucous membrane begins to undergo regenerative changes. The odor disappears, the crusts soften and diminish in amount. The nose is first thoroughly cleansed before the suspension is applied. The suspension remains adherent for about two days. In addition to the local condition, the general condition of the patient improves. The report of six cases is appended. He claims for the treatment lasting results, and states that it is simple and of short duration. *Harris.*

Antral Empyema, With the Presentation of an Efficient Conservative Operation for Its Cure.

H. C. MASLAND (*New York Medical Journal*, July 26, 1913). Masland's operation consists in the introduction of a curved cannula through the floor of the nose into the antrum, and allowing it to stay in situ for an indefinite period. The antrum is opened with a straight trochar, having a drill shaped point. The cannula employed has a collar at its inner end and one beyond the curve. A small silk loop attached to the nozzle enlargement allows the patient to steady the cannula and introduce a syringe tip for the purpose of irrigation. The case is seen from time to time. A month's time usually suffices to effect a cure, even in very severe cases. *Harris.*

The Uses and Limitations of Paraffin in the Treatment of Ozena.

JULIUS AUERBACH (*New York Medical Journal*, September 20, 1913) has made a study of thirty-two cases of genuine ozena treated by the injection of paraffin. After considering the dangers connected with the operation, and describing his technic, he makes the following conclusions:

1. In the injection of hard paraffin of high melting point the danger of embolism is eliminated.

2. The results so far obtained, even in severe cases, afford encouragement for the further use of paraffin injections in ozena.

3. It is impossible to speak of a "cure," even in those cases which show a disappearance of the disagreeable symptoms.

4. There is no influence anatomically on the atrophied structures.

5. Functionally the results are all that can be desired, though all cases eventually require reinjection. *Harris.*

A New Method of Opening the Antrum of Highmore.

LEVINSTEIN (*Berlin. Zeit. f. Laryngologie, etc.*, Bd. 6, H. 3, p. 419), after carefully reviewing the various intranasal procedures, gives his method, which although not new in all details, he considers as overcoming the objections of all the other procedures. After local anesthesia with 20 per cent cocain and injection of 1 per cent novocain under the nasal wall of the antrum, he makes an incision with a Freer septum knife, cutting through the mucous membrane along the pyriform border and parallel to the anterior border of the inferior turbinate, until it reaches the middle of the floor of the nose. The mucous membrane and periosteum are now raised up as far back as the middle of the inferior turbinate and this dissection carried carefully down on the floor of the nose. With a pair of narrow scissors the mucous membrane is cut through as near the insertion of the inferior turbinate as possible, and the flap pushed over against the septum. With any convenient instrument the nasal wall of the antrum is removed as far as the raised up membrane will allow. It is very important to remove the most anterior part of the nasal wall and carefully keep the floor of the nose and the antrum on one level. After as large an opening as possible has been removed without interfering with the insertion of the turbinate, the redundant mucous membrane is cut away, and under no consideration is a flap laid into the antrum itself. If an examination of the lining of the antrum shows that it will be necessary for a complete cure to curette the same, the ordinary radical operation is done through the canine fossa, and only then is it permissible to lay a flap into the antrum.

Horn.

III.—PHARYNX.

On Phlegmonous Inflammations of the Faucial Tonsils, With Special Reference to Etiology and to Local Serum Treatment.

HENKE (*Archiv. für Laryngologie*, Bd. 27, Haft 2) reviews the literature very completely, and gives the results of his experiments in the use of serum prepared by the Heochst Farbwerke, which was prepared by injecting several horses with a variety of streptococcus cultures of high virulence. The sera of the different horses which had acquired immunity against a variety of streptococci were united into a mixed serum. This serum was used in conditions of peritonsillitis with abscess formation, by injecting into the center of the inflamed area two to three centimeters, at a depth of one and a half to two centimeters. In cases where actual abscess formation had occurred, no effect was noticed, except possibly to hasten the spontaneous rupture of the abscess. In other instances, where no suppuration was present, but only an inflammatory infiltration, the disease was cut short completely in twenty cases by the injection. On the day following the treatment the swelling was distinctly smaller, and on the second or third day, as a rule, completely absent. In repeated instances the previously considerable pain had become markedly diminished, so that patients were able to eat and drink without great discomfort. *Goodale.*

Retropharyngeal Abscess.

W. C. BILLINGS AND J. G. WILSON (*New York Medical Journal*, September 20, 1913). The report of a case of retropharyngeal abscess, occurring in a male adult, which was followed later by septic pneumonia and death.

The authors emphasize, first, the fact that the physical signs of retropharyngeal abscess may quickly disappear; second, the necessity for immediate evacuation the moment the diagnosis is made; third, the extreme gravity of the condition and the danger of complications.

As possible causes they give the following:

1. Infection from the middle ear via the canal for the tensor tympani muscle.
2. Sphenoidal sinus infection.
3. Necrosis of the cervical vertebræ.
4. Direct injury to the pharynx itself.

5. Extension from lymphatic gland involvement; the lymph nodes lying between the anterior surface of the vertebral column and the pharyngeal aponeurosis being especially liable to involvement.

6. Thrombosis or embolism arising in connection with septic processes. *Harris.*

The Treatment of the Tonsils.

R. GOLDMANN (*Monat. f. Ohrenheilkunde*, August, 1913). That some of the German school are still widely at variance with their American confreres on the subject of the treatment of chronic diseases of the tonsils is shown in this article by Goldmann. He recommends as a valuable procedure in chronic tonsillar inflammation where cheesy matter can be expressed from the crypts, the careful washing out of each crypt with a bent cannula. If after a long period of this conservative treatment and the patient still complains of local symptoms as well as general constitutional disturbances, the question of complete enucleation should be considered. The various methods of partial removal, removal with a guillotine, etc., he considers not as satisfactory as a complete tonsillectomy. General anesthetics are not to be considered, but a preliminary infiltration with one-fourth per cent novocain is recommended. His favorite position is the Rose position, but he considers Killian's method of suspension laryngoscopy as a great advance. To control the hemorrhage he uses Pean's clamps with torsion, which are left in place until all hemorrhage is stopped. Immediately after the operation he has the patients use a hot foot bath, which he finds overcomes the relaxation caused by the adrenalin. For the pain following the operation he recommends the application of novocain, followed by the application of pure trichloracetic acid. The resultant eschar acts as a plaster against infection and adds greatly to the comfort of the patient. By following this application with tincture of iodin he has been able to feed his patients soft food as early as the fourth day.

In the following conditions he considers the operation contraindicated: Hemophilia, marked cases of heart disease and advanced nephritis, a statement which most American surgeons might agree to.

In children one must proceed with great caution. If the tonsils are greatly hypertrophied, so as to interfere with respiration, a tonsillotomy should be done, but not a complete

removal. Only as a last resort, where the tonsils are small and sunken and are producing marked constitutional disturbances, and where a long course of local treatment has failed to show marked benefit, should the complete operation be attempted. *Horn.*

Modern Surgery of the Tonsil.

T. H. HALSTED (*New York State Journal of Medicine*, December, 1912). Since tonsillectomy has been adopted as the best operation, there has resulted in many cases much damage to the soft palate and the pillars, through the cicatricial contractions following the wounding of these muscles, and particularly of the posterior pillars. These accidental injuries follow mostly the use of the snare and finger in finger enucleation, and in operations done under general anesthesia, where the blood following the first incision has obscured the operation field.

This has resulted in much dissatisfaction with tonsillectomy as well as with the results in many cases. In order to avoid this, each case should be selected with great care, fitting the technic to be employed to the case to be operated on.

The writer mentions two distinct classes of tonsils to be removed: the hyperplastic tonsils, which may be often submerged although not adherent, or but slightly so, to the pillars, occurring most commonly in children under fifteen years old; and the tonsils more or less firmly adherent to the pillars with the surrounding fossæ obliterated as a result of repeated adhesive inflammations, resulting in buried tonsils, occurring in adults and in children over fifteen years old.

In the writer's experience the operation that removes the first class of tonsils with the capsule intact most frequently is that described by Sluder in 1911, and known as the Sluder operation. It is available in over 75 per cent.

In the second class of cases, occurring mainly in adults, the writer prefers to operate under cocain anesthesia, with the patient sitting up; a one per cent cocain solution with a little adrenalin being injected into the anterior and posterior pillars external to the tonsils.

The operation is then performed in the usual way, by dissection and snare. As some fatalities have been reported from adrenalin, due apparently to a large quantity being thrown suddenly into the circulation, only a small and highly diluted amount should be used. *Theisen.*

IV.—LARYNX.

The Surgical Treatment of Laryngeal Tuberculosis.

ARNOLDSON (*Archiv. für Laryngologie*, Bd. 27, Heft 1) reviews the statistics of six hundred personal cases, from which he concludes:

1. Laryngeal tuberculosis is secondary. The reverse relationship is extremely seldom, and does not need to be considered in practice.

2. Medicinal local treatment of laryngeal tuberculosis has no essential influence on the course of the disease.

3. Endolaryngeal surgical treatment is in general safe, being followed neither by infection of the wound nor by inhalation pneumonia.

4. Endolaryngeal excision, including amputation of the epiglottis, has the especial advantage of a rapid functional improvement.

5. Partial or total laryngeal excision of tuberculous cords may have, in suitable cases, good results, especially improving the voice, and leading to clinical healing.

6. Spontaneous healing or improvement may occur in a few favorable cases, but should not therefore lead to neglect of a rational local treatment.

7. Chief emphasis must be laid upon general hygienic and dietetic management, together with active rational local treatment in institutions for tuberculosis. *Goodale.*

Experimental Surgery of the Bronchi.

CALDERA (*Archiv. für Laryngologie*, Bd. 27, Heft 2) concludes that in wounds of the bronchi which penetrate transversely all layers of the organ, there is little danger of a fatal result, if an infection from the outside is avoided, and the margins of the wounds are immediately approximated. The microorganisms ordinarily present in the lumen of the bronchi are customarily so attenuated in their virulence that they have no pathologic significance for the individual.

The isolation of a portion of the bronchial tubes, and the interruption of its channels of nutrition, does not lead to necrosis of the affected portion and to its exfoliation. It is rather, on the other hand, inclined to unite with the upper and lower portions of the tubes through connective tissue,

which show a deposit of lime salts. This union may take place even with specimens of tissue which have remained forty-eight hours outside the system. *Goodale.*

Laryngeal Paralyses in Acute Bulbar Paralysis.

FREYSTADTL (*Archiv. für Laryngologie,* Bd. 27, Heft 2) reports a case of acute bulbar paralysis ushered in by fever and prostration, and exhibiting on the third day difficulty in swallowing and loss of voice. Laryngeal examination showed paresis of the internal, transverse, and lateral muscles. The patient was unable to swallow fluids or solids. A slow improvement followed during the following two weeks, with return of normal motion in the larynx.

Another case was observed, exhibiting also sudden onset, involving the larynx in a similar fashion, together with disturbance of taste and difficulty in swallowing. Improvement followed within a few weeks.

Both cases suggested a myelitis bulbi, arising in consequence of infection. The author concludes from his observations that Semon's law is not applicable to laryngeal paralyses of bulbar origin. *Goodale.*

Suspension Laryngoscopy.

KILLIAN (*Archiv. für Laryngologie,* Bd. 26). The author's method of direct examination is described, which he recommends especially in conditions where accurate manipulation is required. The majority of cases were laryngeal tuberculosis, requiring curetting of the ulcerations. It is also employed in cases of papilloma, especially in children, under general anesthesia. Here it was possible to remove the papillomata without tracheotomy. For purposes of demonstration to students, the method is useful. In adults it is usually sufficient to inject morphin and scopolamin, in doses of 6 dmg. scopolamin and 2 cg. morphin. This brings about a diminution in the excitability of the cerebral cortex motility as well as of sensation.

The patient is placed on his back on the operating table, with the head hanging down, supported by the apparatus in the correct position. The tongue depressor is introduced, and the base of the tongue and larynx cocainized. The laryngoscopic picture thus obtained is clearer than by any other method. *Goodale.*

Safety Pin Removed From the Larynx of a Child by Direct Laryngoscopy.

HARMON SMITH (*New York Medical Journal*, August 16, 1913). The patient was a child of two and one-half years, who was suddenly taken ill with a croupy cough. Diagnosis of bronchial croup was made. The usual measures for croup relieved the condition. Five days later there was a return of the croup with marked dyspnea. Diagnosis of membranous laryngitis was then made and an intubation tube inserted, with relief to the breathing. Diphtheria antitoxin was injected, although a culture of the throat was negative. The third attack, taking place two days later, was relieved by ipecac. An examination was made at that time with the laryngeal mirror, and a diagnosis of papilloma made. Thirty-seven days after the first examination the child was examined by the direct method by Dr. Smith, and instead of papilloma, a safety pin was seen and removed from the larynx, followed by an uneventful recovery.

The reporter calls attention to some of the remarkable incidents in the history of the case. He properly criticises the failure to have an X-ray picture taken at the onset, and dwells upon the fact that the intubation tube could be introduced and removed without altering the position of the pin, as well as the unreliability of an indirect examination in a small child.

Harris.

Relative Considerations in the Galvanoplastic Treatment of Tuberculosis of the Larynx.

BAR, Nice (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie*, September-October, 1913). The galvanocautery treatment of laryngeal tuberculosis is not new. It has passed through the period of undue enthusiasm which attends all new remedies. Today many of the most prominent laryngologists heartily favor it. The latest statistics are from the Basle clinic, where sixty-five cases have been treated by this method. Of thirty-five cases where there was no temperature, eleven were cured, five relapsed, and eleven died; five disappeared from observation. In thirty-two cases with fever where the cautery was used, there was only one case of cure, fifteen deaths, and ten not controlled. This would

give, in effect, 33 per cent of cures in nonfever cases, and only 3 per cent in cases with fever.

The author comments favorably upon the division by Krause of laryngeal lesions into two groups, the one leading to ulceration and destructive lesions, the socalled infiltrating ulcerating form; the other presenting a slow evolution and offering possibilities of cure, the hypertrophic form, for which surgical measures are indicated. The epithelial distribution in the larynx also favors the use of the galvanocautery. The two surfaces of the epiglottis and the median middle portion of the vocal cord are covered with pavement epithelium. Here the ulcerations are wont to be superficial. All the other portions of the larynx, the borders of the epiglottis, the arytenoid space, the anterior and posterior portions of the vocal cords, the ventricular bands, are covered with cylindrical epithelium, which support the glands through which the infection proceeds into the submucous layer, producing the well known infiltration characteristic of the epithelial distension found in tuberculosis. In consequence, it will be very rare that we will be obliged to cauterize the median portions of the vocal cords and the surfaces of the epiglottis. The deep cauterization recommended by Mermord is favored. Thorough cocainization is essential.

The author defines the indications for cauterization as follows: (a) Tubercular tumors of the larynx; (b) circumscribed infiltration of the larynx having a tendency toward ulceration; (c) chronic ulcerations seated upon inflammations and covered by granulations, resisting all other forms of treatment; (d) unilateral affection of the larynx.

The contraindications are: (a) Pulmonary tuberculosis in an advanced state complicated by fever and cachexia; (b) miliary tuberculosis of the larynx, or of the larynx and pharynx; (c) the various cachexias; (d) pronounced stenosis of the larynx occasioned by inflammatory tumefactions of the infected parts; (e) patients who are nervous and irritable with a poor resistance. *Harris.*

A New Method for Taking X-Ray Photographs of the Larynx.

RETHI, Budapest (*Zeit. f. Laryngologie, etc.*, Bd. 6, No. 1, p. 27), has published an ingenious method by which he has succeeded in taking some beautiful X-ray photographs of the

larynx. He cuts a film in a club shaped manner, about four and one-half inches long, two inches wide at the upper end, and one inch wide at the lower end. This is wrapped in black and oiled paper in a certain manner, for the details of which the original article must be consulted. After thoroughly cocainizing the pharynx and base of the tongue, the patient is laid on the table and the film introduced into the back of the throat as far down as possible. The exposure is made from below upwards, with a properly protected tube. The plates as shown are very clear and show the hyoid bone, the membrana hyothyreoidea, the contours of the epiglottis, the vocal cords and the true cords, and many other details. In pathologic conditions the plates have proved of great assistance, and an atlas will shortly be published giving many more plates. *Horn.*

Original Endoscopic Methods.

RICHARD H. JOHNSTON (*Laryngoscope*, May, 1913) describes his methods of direct laryngoscopy with the patient in a sitting position and under local anesthesia. The patient is seated on a low stool with the head supported, but not held by an assistant. At the entrance of the laryngoscope the head is slightly extended and turned to the right or left, according to the side of the mouth the instrument is to be inserted. The instrument is introduced between the bicuspid teeth and passed down, the tongue being pushed to the opposite side. On the appearance of the epiglottis, the spatula end of the laryngoscope is passed behind it, and a slight pressure on the handle brings the larynx to view. If the anterior commissure is not seen, the head is pushed forward until it is in the straight position, when all parts of the larynx can easily be seen. With this method of operating and with the Jackson instruments the majority of patients can usually be thoroughly examined or operated upon at one sitting. In children under six years of age the straight method without anesthesia is used, the child being wrapped in a sheet and placed on the table with the head flat. It is possible to do away with assistants in examining the bronchi and trachea, if the patient is placed on a rather high cushion, with the head supported by another cushion. After the introduction of the bronchoscope the cushion under the head is removed and the head

dropped to the plane of the table. The operator sits at the head of the table and regulates the up-and-down movement by a small pillow. *Richards.*

V.—MISCELLANEOUS.

On Local Treatment With Neosalvarsan.

PFEIFFER (*Archiv. für Laryngologie*, Bd. 27, Heft 2). Neosalvarsan is a preparation consisting of two parts of salvarsan and one part hyraldit (sulphooxylate of formaldehyd), which is neutral and soluble in water. In Vincent's angina this preparation brought about prompt disappearance of the deposits and cut short the course of the disease. In syphilitic affections of the mucous membrane, neosalvarsan was employed locally in combination with the combined salvarsan, mercury and iodid treatment. The subjective discomfort and the objective appearances showed regularly a striking and prompt improvement. In pyorrhea alveolaris, the author employed it in one case, with the result of producing prompt improvement. *Goodale.*

Gout in the Upper Air Passages.

ARTHUR THOST (*Archiv. für Laryngologie*, Bd. 26) divides the manifestations of gout in the upper air passages into: 1. Gout of the joints and cords. 2. Gout of the mucous membrane itself.

Gout of the Nose.—Hay fever is regarded in a large proportion of cases as one of the manifestations of this condition. In chronic nasal catarrh, gout may be assumed to exist, especially where intense reddening, swelling and irritability of the mucous membrane is found.

Gout of the Mouth and Pharynx.—Manifestations here are characterized by reddening, smooth shining appearance of the mucous membrane, with marked sensitiveness to all irritations, particularly swelling of the lateral granules and posterior pillars is present. In the mouth, gouty manifestations of the teeth have long been known, characterized by chronic destructive inflammation of the radical membrane of the teeth, with more or less marked inflammation of the pulp, and destruction of the alveolar process in the region of the affected teeth.

In the larynx gout affects the cords, joints and cartilage.

in the form frequently of deposits which may be recognized during life, and may even lead to confusion with carcinoma. These deposits may give rise to inflammation, and even fungous ulceration of the ventricular bands. *Goodale.*

Hot Air Treatment in Laryngology.

W. ALBRECHT (*Archiv. für Laryngologie*, Bd. 26, part 3) recommends the use of hot air in acute and subacute and chronic laryngitis, especially the dry form. In edema of the larynx, both acute and chronic, he has so far tried it only in edema of a tubercular nature, but recommends it on theoretic grounds in other forms. The curative effect is to be attributed to the absorbing property of the increased current of blood occasioned by the heat. He recommends it also in conditions of cicatricial stenosis in the larynx, on the assumption that a hyperemia and a loosening of the parts will follow, and therefore permit more readily the passage of bougies. The apparatus consists of a small box, into which hot air is introduced by means of a lateral tube of ear trumpet shape, placed over a flame. A box is so constructed as to fit over a patient's neck, while in the recumbent position, the air being drawn through opening in the side of the box. *Goodale.*

A Study of Mycosis of the Mucous Membranes of the Upper Respiratory and Digestive Tract.

SEGURA (*Archives Internationales de Laryngologie, d'Otologie et de Rhinologie*, July-August, 1913) reports eleven cases, all seen by him with one exception, of mycosis of the nose and throat, due to the presence of the sporotrichum. They were all characterized by the typical budding aspect of sporotrichosis. The ulcers had irregular borders. They were bathed with seropus, and the floor of the nasal fossæ was covered with thick crusts. In certain areas the presence of small follicular masses could be noted in the form of minute brown spots. In one case the destruction of the uvula and a part of the tonsillar pillars took place.

The eleven cases are reported in detail. The diagnosis in a number of them was obscure. The therapeutic test with iodid of potash cleared it up. Recovery took place in all. The author, in discussing the cases, states that in only exceptional instances was it possible, either by a histologic exam-

ination or culture, to discover the parasite. In the absence of this, diagnosis was based upon the negative Wassermann in every case, and especially upon the small dose of iodid of potash which produced a cure. In conclusion he refers to the serious results following a mistaken diagnosis of tuberculosis or syphilis. *Harris.*

The Treatment of Cancer of the Esophagus by Means of Radium.

GUISEZ (*Paris Medical*, No. 12, February, 1913) again reports some brilliant improvements by his method. He has increased the dose to 5 to 10 cg., and more, and uses the monobromid of radium. The radium in a small silver container is attached to a number 16 to 18 olive and swallowed by the patient, being allowed to remain in place for from four to five hours. Improvement is seen within thirty hours. The most brilliant results have been obtained in scirrhous cancers, but a very good result was obtained in fungous type.
Horn.

Meningitis and Brain Abscess Caused by the Bacillus Fusiformis Following a Needle Wound of the Pharynx.

FRUEWALD (*Monat. f. Ohren.*, August, 1913) reports an exceedingly interesting case from the Chiari Clinic, in which a child of four years swallowed a needle which lodged just above the larynx. In the attempt at extraction the needle was broken; the remaining piece was not located and the patient was taken from the clinic. One week later the patient returned, complaining of fever, headache and stiff neck. After several ineffectual efforts at local extraction, an external operation was done, and after great difficulty the piece was located. The patient was again discharged, but returned three weeks later with symptoms which pointed to a tubercular meningitis. The death of the patient followed in a few days, and the autopsy showed a temporal lobe abscess the size of a hen's egg with an extensive basal meningitis. The bacillus fusiformis was found in the abscess in pure culture, and undoubtedly gained entrance to the meninges from the original trauma. *Horn.*

Esophageal Tuberculosis.

LORENZO B. LOCKARD (*Laryngoscope*, May, 1913), from his study of literature concerning esophageal tuberculosis, finds that tuberculosis of the esophagus is very rare, and a primary

infection of the esophagus has yet to be observed, although it is believed that the first infection of the body, in some cases of glandular tuberculosis, occurs by the way of the esophagus. Infection usually comes from sputal inoculation of tissues predisposed through injury, from pulmonary tuberculosis and cancer, through direct inoculation by sputum without previous injury, from extension through larynx and pharynx, from tuberculosis due to caries of the vertebræ, from extension by continuity from caseous bronchial glands, and from unclassified sources in which the primary channel of infection cannot be traced. From the study of the analysis of eighty-nine cases it was found that there was a tendency to involvement of the esophagus in cases of chronic lymphatic tuberculosis, a frequency of association of intestinal and esophageal lesions, little significance attached to the subjective symptoms, a diagnostic value to dysphagia and odynphagia of sudden onset, and a role played by tuberculosis in the production of traction diverticula. Diagnosis must be largely made by exclusion, eliminating such diseases as syphilis, cancer, caustics, stenosis through compression, actinomycosis, nontuberculous diverticula, and sporotrichosis. Microscopic examination is essential for differentiation. Very little can be done in the way of treatment, for in the majority of cases the complication of the lesions is of such an aggravated nature as to make local treatment impossible. When tubercular esophageal lesions are diagnosed early enough, such local applications as lactic acid, formalin, orthoform, etc., give about the same results as when applied in a tubercular larynx. Stenosis may be relieved by dilatation; spasms incident to ulceration may also be relieved in the same manner. *Richards.*

Intracranial Nerve Division.

CHARLES H. FRAZIER (*Journ. Amer. Med. Assoc.*, August, 1913) describes the intracranial division of the auditory nerve for the relief of a persistent tinnitus. The tinnitus may be alone, or it may be accompanied with otalgia. Only such cases are suited for operation in which the tinnitus is so severe as to cause grave neurasthenia or serious mental disturbances; both are often the cause of threatened suicide. Care should be taken in the selection of cases, all those of central origin being excluded. The appropriate ones are those which are

labyrinthine in origin; it may originate in the vestibular ganglion, in the cochlear ganglion, or in both; and as there is no means of separating the vestibular from the cochlear division, the entire auditory trunk must be sacrificed. The best cases are those in which there is loss of air conduction with preservation of bone conduction; cases with definite cochlear lesions in which the tinnitus is low pitched. The deafness resulting from the complete section of the auditory nerve is one of the obstacles to be considered, but as a rule the patient is already deaf on the affected side. The operation should only be done by a skilled operator and one who has had a great deal of experience. The appliances for securing the proper posture of the patient are absolutely essential. The displacement of the cerebellum must be effected without undue trauma on the adjacent pons and medulla, and should not be attempted without taking advantage of the additional space to be derived by evacuation of the large basal cisternæ. The separation of the auditory nerve requires patience, and although the auditory nerve is larger than the facial, no chances should be taken until the facial nerve is identified by electrical stimulation. *Richards.*

Radium Therapy in Laryngorhinology.

MARSCHIK (*Wiener medicinische Wochenschrift,* No. 50, 1912). The report of a case of scleroma of the nose and pharynx, in a man thirty years old. The pharynx and alæ nasi were greatly infiltrated, and the radium treatment was given in three sittings, for over three hours each time. After four weeks, the following results were noticed: The infiltration of the alæ nasi had almost entirely disappeared, as well as that in the pharynx, and had been replaced by healthy looking cicatricial tissue.

In a second case, that of a school teacher, aged seventy years, the radium treatment was used for a carcinoma of the right upper jaw. The neoplasm had extended to the posterior orbital region and had caused fixation and protrusion of the eyeball. The maxillary sinus, which had been opened through the canine fossa, was found to be filled with a tumor mass. The diagnosis of a suppurative sinusitis had been made. The tumor masses were removed and the radium treatment

used, and three months afterward, no recurrence had started. The patient also gained greatly in weight.

In a third case, that of a man fifty years old, with a carcinoma of the upper part of the esophagus, just under the cricoid cartilage, with perforation into the trachea, the radium treatment was used after a tracheotomy had been performed, so that the radium application could be directly applied. The result was very marked within a short time. An esophagosocpy, which before had been impossible, could now be done, and the larger bougies could be readily passed. Patient later on died of a pneumonia, resulting from his perforated tracheal wall.

Theisen.